AMERICAN BUILDER

THE WORLD'S GREATEST BUILDING PAPER

Vol 41. No. 5.

CONTENTS FOR AUGUST, 1926

COPYRIGHT, 1926, BY AMERICAN CARPENTER & BUILDER CO.

Page

Around the Family Table....103
Editorial Page....105
A Builder of Fine Homes....107
Presenting Four Notable Structures....110
ART SUPPLEMENT OF NOTABLE ARCHITECTURE....125-128
The Sterling Memorial Library, Yale University; James Gamble Rogers, of New York, Architect.
The Spink County Court House, Redfield, South Dakota; Toltz, King & Day, Inc., of St. Paul, Minn., Architects.
The New Equitable Trust Co. Building, Broad Street, New York City; Trowbridge & Livingston, of New York, Architects.
The Park Lane Apartment Hotel, Spring and Linden Avenues, St. Louis, Mo.; Preston J. Bradshaw, of St. Louis, Architect.
Church Building in New York....115
Paine Thrift Bank....122
Details of Home Building....124
Hollow Tile.
Furnace Heating....126
Forced Air Heating.
Landscape Architecture....128
The Small Rock Garden.
Mr. Radford's Talk on Home Building....130
BLUE RIBBON HOMES IN COLORS..131-146
The Washington....Colorplate I
The Wadsworth....Colorplate II
The Waukegan....Colorplate III
Photos of Beautiful Interiors...Colorplates IV-V
The Wildwood....Colorplate VI
The Wayside....Colorplate VII
Two Narrow Lot Homes....Colorplate VIII
The Wakefield.
The Walden.
Two Economy Homes....Colorplate IX
The Waltham.
The Ward.
The Whitney....Colorplate X
Beautiful Home Gardens...Colorplates XII-XIII
The Warwick....Colorplate XIV
The Wabash....Colorplate XV
The Waco....Colorplate XVI
Our Front Cover Home....147-151
Photograph and Full Set of Building Plans Drawn to Eighth Inch Scale of the Beautiful Home Pictured in Full Colors on Our Front Cover.

Page

Instructions in Roof Framing....152
A Study of the Lean-to Rafters.
Better Plastering....154
Economies and Details of Stucco Overcoating.
A Business Block of Hollow Tile....157
A Hog House with Ample Sunlight and Good Ventilation....158
In Gas Heated Houses Insulation Proves Its Economy....159
A Mediterranean Style of Home....162
How Dan Does It....163-164
A Roof Framing Idea.
Attaching Shelves to Concrete.
A Perspective Drawing Kink.
Building Concrete Forms.
Tight Baseboard Joints.
Squaring Colonial Columns.
Nailing Plugs for Tile Walls.
An Emergency Drill Point.
To Measure a Diameter.
What's New?....166-190
For Cutting Outlet Holes.
Tile Effects in Wood Roofing.
New Woodworking Tool.
Fireplace Fuel Lift.
Convenient Clothes Drier.
Quick Hardening Concrete.
A Close-Corner Sander.
A Dimming Light Switch.
End Discharge Concrete Mixer.
Vitrified Pottery Fixtures.
Air Turbine Concrete Surfacer.
Water Softeners in All Sizes.
Steel Ventilating Windows.
Warm Air Humidifier.
Dependable Automotive Hoist.
Shoes Make Ladders Safe.
New Bell Ringing Transformer.
Gas Water Heater Control.
Self Holding Tee Square.
Builder's Level Improved.
Efficient Cutting Tool.
New Stucco Paint Perfected.
New Type Asbestos Shingle.
Folding Built-in Ironing Board.
Novel Electric Water Heater.
Motor Driven Hoist Trolley.
A Simple Calculating Device.
Lightning Protection.
A Better Door Latch.
Space Saving Refrigerator.
Uniform Concrete Is Produced by Control of Proportions.
The Right Paint for Every Job.
Motor Truck Department....192
News of the Field....196
Books, Catalogs and Booklets Received....198
Advertisers' Index....287-289

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Unusual Building Activity

FROM reports of building permits issued and plans filed in 462 cities for the first half of the current year, it is evident that building activities generally, throughout the country, will proceed during the rest of the year on a basis not greatly at variance from the conditions that prevailed throughout the year 1925, according to the monthly building survey prepared by S. W. Straus & Co.

The totals from these cities, as reported, show building permits issued of $2,218,002,775, compared with $2,343,308,089 for the first half of 1925, a loss of 1 per cent.

Against this slight falling off, the figures for June revealed a rather surprising volume. Permits issued in the 462 cities were $413,593,412 compared with $384,321,193 last June, a gain of 7½ per cent. The significance of the figures lies in the fact, however, that they represent a gain over May of this year of substantially 5 per cent, which is abnormal.

Normally, there is a rather sharp decline between May and June, sometimes running as high as 10 per cent. Last year, when building activities were proceeding with unprecedented momentum, June permits were just about equal to those of May. Whether this June spurt marks the beginning of a period of even more intensive building activity than has ever before been experienced in the United States, or whether the June reports represent a considerable volume of accumulated projects that were deferred from the spring months, due to unfavorable weather conditions, cannot now be determined.

✣

New Cement Specifications

AT the annual meeting of the American Society for Tesing Materials, changes in portland cement specifications were adopted, subject to letter ballot, and will undoubtedly be finally approved about September 1. In the meantime, at least one of the big cement manufacturing companies is already giving its customers the benefit of this revision, all its cement sold after July 1 conforming to the new requirements.

The new specification has been rewritten to conform in general phraseology with the U. S. Federal Specification Board's proposed Master Specifications for Portland Cement. The principal changes are a 25-pound increase in tensile strength requirements of standard mortar briquets, from 200 to 225 pounds to the square inch for the seven-day period and from 300 to 325 pounds to the square inch for the 28-day period and the elimination of the specific gravity test. Some minor changes have also been made.

✣

Would Limit Surety Bonding

UNDER existing conditions, field agents for surety companies entering into intensive competition for commissions from selling bonds, have been providing surety for irresponsible builders, it is claimed. Incapable or dishonest builders defaulting on their contracts have been the cause of delays on jobs and serious losses to the owners. In addition to these losses contractors and the general public have sustained a considerable loss because of the fact the defaulting has greatly increased the premium rates on bonds and this extra cost has been borne by the contractor or passed on to the public.

A movement is now under way to relieve the industry of these unnecessary costs and delays. The plans call for a closer questioning by surety officials of bidders who seek bonds. The movement is sponsored by the Joint Conference on Construction Practices which is composed of representatives of architects, engineers, state highway officials, surety company officers and contractors' organizations.

✣

For Fire Safe Chimneys

IT may be that a time will come when fire departments will no longer be needed for every structure will be so built that it will be entirely safe from the danger of fire. At present we are very far from such a condition and the annual fire losses of the country amount to a truly staggering figure. While many of these destructive fires are not classed as preventable, many others fall in the preventable class. Against these protection can be obtained by the c[illegible]eration of all who may be concerned in the building of hous[illegible]and other structures.

The fact that the second largest cause of preventable fires is defective chimneys and flues, emphasizes the importance of the elimination of this source of danger: "Stopping Fires Due to Chimneys and Flues" is the title of a pamphlet, by D. Kickerbacker Boyd, published by the National Fire Protection Association, which points out in clear and concise words the need of more general adoption of chimney ordinances, or of a national chimney code along the lines of the Chimney Ordinance of the National Board of Fire Underwriters.

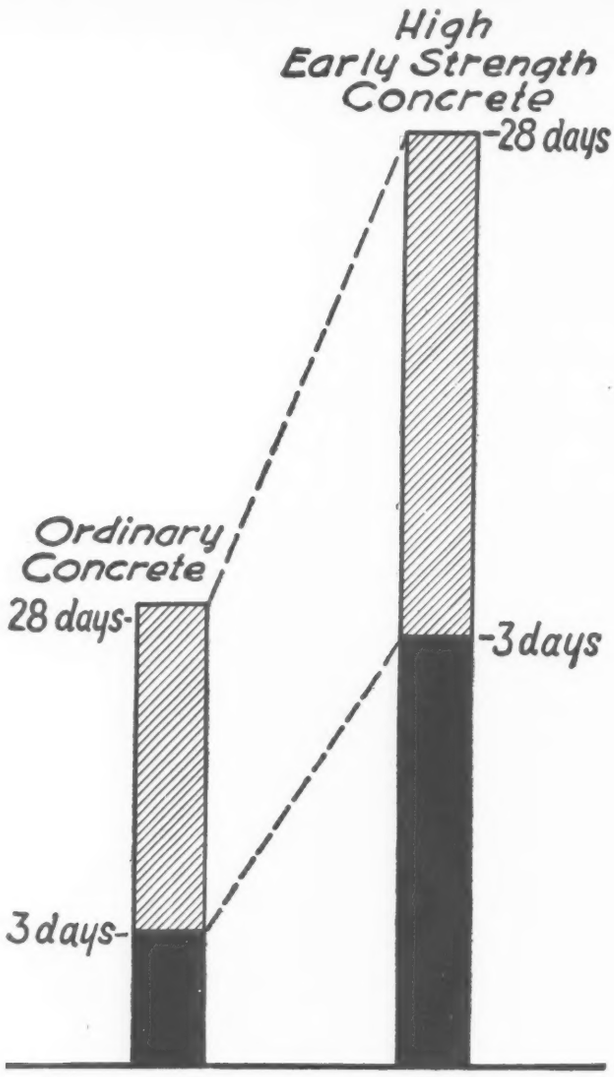
✣

Forest Tax Revision

PROBABLY the most vital need for the establishment of reforestation on a commercial basis is the revision of existing tax laws so that the growing of forests may be carried on without financial loss. The present tendency is toward establishment of nominal land taxes on growing timber with yield tax to be levied at the time of cutting.

Though the legislatures of only 13 states have been in session during 1926, action taken in recognition of this need of tax revision shows an encouraging advance in constructive work along foresty lines, in practically all these states. Conspicuous among these were New York, Kentucky, Washington, California, Mississippi and Minnesota.

New York, which has long experimented with three acts that have been hopelessly tangled in red tape, cleared all these measures and passed a comprehensive act along the line suggested above. A similar action was taken in Kentucky and Washington passed a bill proposing a constitutional amendment for encouraging forestry and taxing on a yield basis. Similar amendments are to be considered by the voters of both California and Minnesota in the November elections and Mississippi has created a forestry commission.



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AB-8

A Builder of Fine Homes

K. M. Vaughn, of Tulsa, Oklahoma, Specializes on Only the Finest Residence Work

THE average motorist who tools his car about his home city on Sunday and looks over some beautiful new addition, rapidly building up with luxurious homes, never fully senses or appreciates what is happening. To him the springing up of these artistic and imposing homes is but a part of the natural development of his city. He never realizes the tremendous amount of preliminary thought and planning, the cost in money, the time and effort required and the advertising which must be put forth before the first sale of lots for the future homesites can be carried out.

Three years ago C. H. Terwilleger, one of the leading members of the Tulsa, Okla., Real Estate Board and a well-known civic leader in that city, purchased an 80-acre tract adjoining the city on the southeast. The tract was in a raw and undeveloped state. It was just gently rolling, fairly well wooded, but unimproved Oklahoma land.

This Is K. M. Vaughn, the Young Man Who Has Become Known in Tulsa, Oklahoma, as a Builder of Fine Homes.

But Terwilleger had lived in Tulsa for years. He had correctly gaged the trend of the growth of the exclusive residential section in that rapidly expanding city, which is toward the southeast. This 80 acres lay right in the trend of high class residential expansion. Terwilleger paid $200,000 for the 80 acres, unimproved as it was.

But he made no attempt to sell any part of it. Soon landscape architects, surveyors, engineers and other trained technical men began to swarm over the tract. Then the raw woodlands became a beehive of activity. Beautifully curving paved boulevards, taking advantage of the natural contour of the ground, went in. Sewer lines, water mains, electric current lines, telephone wires, gas mains and other city improvements were installed. Attractive little parks and playgrounds were laid out.

Lawyers drew up easements which would give the necessary right-of-way for any future public improvements which might possibly be required, and formulated restrictions which would forever keep out of the tract either moderate priced homes or business or apartment houses.

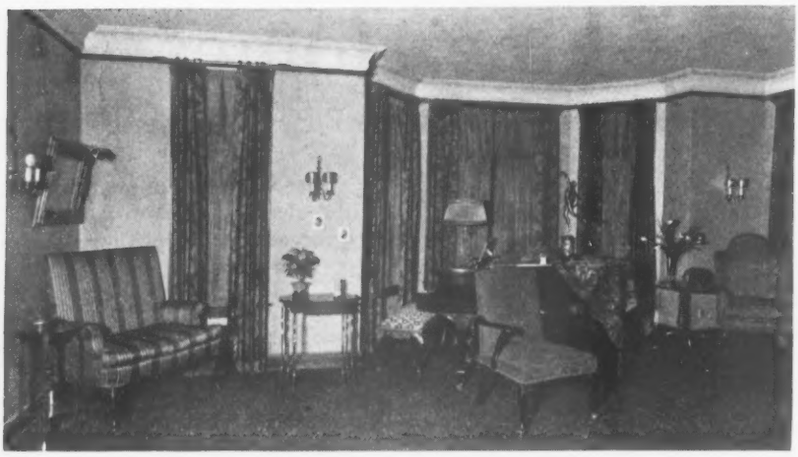
Even "white way" street lights were provided and installed. Still Terwilleger made no effort to market the beautiful home sites which the tract now contained. He was waiting until the addition should be fully ready and until the public should have time to look it over and grasp the desirability which he had built into it.

In April of last year he decided that Terwilleger Heights was ready for the public. He started to sell the spacious and attractive homesites which it offered. But he realized that the American public buys its fine homes where other fine homes are located. So he called to his aid a young Tulsa man who in a very few years has made an unusual record as the builder of imposing homes. He is K. M. Vaughn.

Just eight years ago Mr. Vaughn landed in Tulsa one morning. By noon of the next day he had not only purchased a lot but had men at work building a residence for sale. That constitutes fast work even in Tulsa where realty transactions regularly set speed records. In the intervening eight years he has built and sold residences which cost about $3,000,000 to build, exclusive of the price of the lots and his profits. And Mr. Vaughn is not noted for selling his beautiful residences at a loss. It might be mentioned that he was in his twenties when he landed in Tulsa and is now just 35 years of age.

He does not put on any additions of his own; he buys lots from the other fellow and builds such attractive houses

Two Vaughn-Built Residences in the Terwilleger Heights Addition Which Show the Widely Different Types of Architecture Found in the Imposing Residences that Are the Work of This Successful Builder.



The Completely Furnished Living Room, in the Vaughn Exhibition House, as It Appeared When Opened for Public Inspection.

that they are certain to sell. He purchased several attractive lots in the new, exclusive addition and started building. In addition he co-operated with Terwilleger in planning most of the other imposing residences in the addition.

It is one of the characteristics of Mr. Vaughn's building operations that he does not stick to any particular type of architecture; neither does he adhere to any one building material. In Terwilleger Heights he is building Spanish homes of stucco; he has completed and sold imposing residences of the distinctly Tudor-Gothic type of architecture and constructed of hollow tile and brick.

Since development of the tract began, the Vaughn-Terwilleger combination has succeeded in getting more than $700,000 worth of residences built. Since this consists of but 45 residences it can readily be realized that every house is far above the average in cost. This figure includes only the building cost and not the price of the lot or any profit.

The entire city of Tulsa built about $10,000,000 worth of new structures last year. This includes everything from a private garage to big office buildings. Few cities of its population will equal that record anywhere in the United States. But the Vaughn-Terwilleger combination is responsible for about one-tenth of the building in the entire city since they started work last April.

Vaughn originated the plan of showing imposing homes in a fully furnished condition, so far as Tulsa is concerned. The interior views accompanying this article show why he sells his homes just as soon as they are completed. The artistic English home, from which these views were taken was opened to public inspection with the announced purpose of keeping it open for several weeks. But it was sold almost before it was opened to the public.

Like Every Other Room in the House, the Dining Room Was Perfectly Appointed, Making a Far Finer Impression than the Unfurnished House Could Have Made.

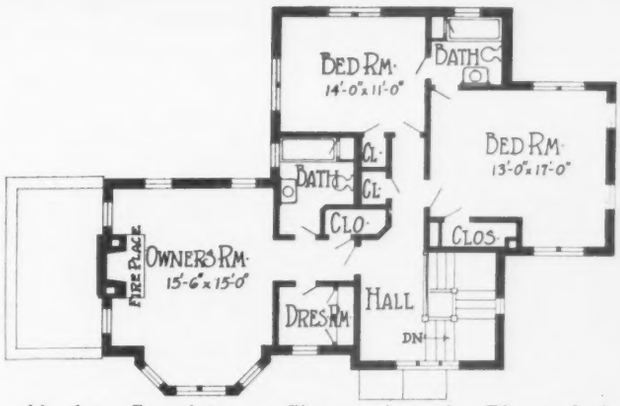
One of the Bedrooms in the Exhibition House Displayed by K. M. Vaughn in the Terwilleger Heights Addition of Tulsa.

The Life of a House

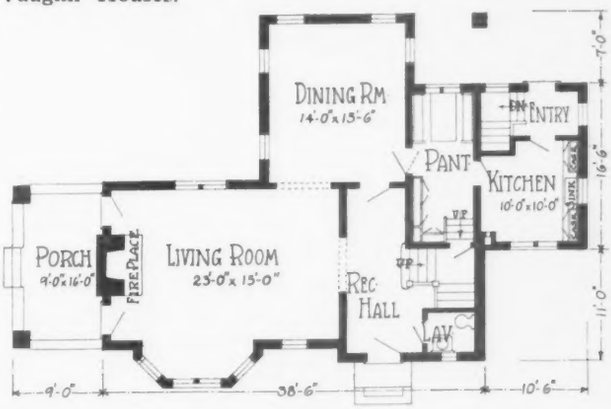
MANY houses, though in good condition and capable of many more years service, are torn down to make room for the growth of cities and others are abandoned because the neighborhoods in which they are built change and they are no longer desirable for residence purposes. Other houses, more fortunately located, live out their entire lives until destroyed by corrosion and decay. To discover how long the latter class of dwellings may last, an extensive investigation was made by the National Lumber Manufacturers' Association of the records of assessors, engineers, valuation experts and others with experience in the appraisal of real property.

It was found that, while individual houses sometimes last several hundred years, as for example the famous frame house at Dedham, Mass., which was built in 1636, their average life is much shorter and complete structural depreciation will generally occur within one hundred years. The actual life is about equal to the threescore and ten which is supposed to be accorded to human beings. Contrary to expectation, it was found that frame dwellings depreciated in value only a little more rapidly than those of brick or other masonry when properly cared for.

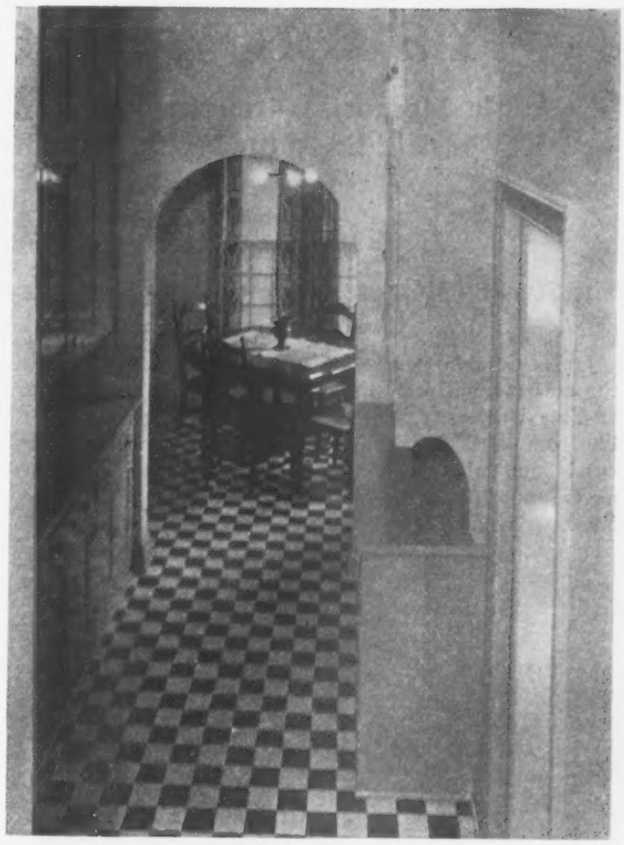
"GOOD architecture for small houses is largely common sense so applied as to make the difference between a house which is a mere shelter from the elements and a home which is beautiful, comfortable and durable."



Absolute Completeness Characterizes the Plans of the Exhibition House Pictured Below, Which Is Typical of All Vaughn Houses.



The Rooms Are Spacious and Every Appointment Is in Harmony with What Would Be Expected of Such a Home.



Even the Pantry Is Perfect in Every Detail and a Glimpse of It Causes No Jarring Note with the Beauty of the Dining Room Beyond.

This House Was Built to Be Exhibited Completed Furnished as an Example of What Terwilleger Heights Offered to the People of Tulsa, but It Was Sold Almost Before It Was Ready for the Opening.

Yale to Have New Library

Notable Memorial Structure by James Gamble Rogers; Court House, Office Building, and Apartment Hotel also Presented in Duo-tone

By BERNARD L. JOHNSON
Editor, American Builder

The Sterling Memorial Library, Yale University

James Gamble Rogers, Architect

James Gamble Rogers, of New York, is the architect for the new monumental library to be erected as a memorial at Yale University, New Haven, Conn., to John W. Sterling, one of Yale's eminent graduates. The library will cost about $6,000,000, funds being provided by the trustees of the Sterling estate, and will have a book capacity of 5,000,000 volumes.

The site of the new library will be bounded by High, Wall and York streets. The library building will be Gothic in style and will harmonize with the Harkness Tower and the Memorial Quadrangle, also designed by Mr. Rogers.

The building will be 192 feet high and 82 square. It will taper slightly from its base and is almost cathedral-like with its great columns, stained glass windows, and nave-like entrance. The main tower will have 22 floors. The building will be in a warm colored yellow stone.

New Court House Building Spink County Redfield, South Dakota

Toltz, King & Day, Inc., Archtects

The new court house building for Spink County at Redfield, South Dakota, Toltz, King & Day, Inc., architects and engineers, St. Paul, Minn., will have many interesting and unique features.

The building will be 108 feet wide and 98 feet deep; and a particular feature of the plan is the arrangement of a large central light well covered by a skylight, around which light well extend the corridors on second and third floors. This gives an extremely monumental character to the interior and at the same time it results in extreme economy in space.

The percentage of actually usable and well lighted space in this building as compared with the total space, will approximate the percentage of usable space obtained in modern economically planned office buildings.

The exterior of the building will be faced with Indiana limestone and brick. The walls on the interior rotundas are faced with Tavernelle marble and all floors in the rotundas are of Tennessee marble.

The cost of this structure, including furniture, equipment, etc., will not exceed $350,000. It will be ready for occupancy on or about June 1, 1927.

The New Equitable Trust Co. Building New York City

Trowbridge & Livingston, Architects

The new Equitable Trust Company Building will be about 500 feet in height and will be constructed of brick and limestone. It will embody a number of new ideas in modern business convenience and utility. It is believed that the building will be completed and ready for occupancy on or about May 1, 1928.

Good natural lighting and ventilation have been serious problems in New York's congested financial district and the 500,000 square feet of office space, which will be made available when this spacious building is completed, will be a welcome addition to Wall Street's business facilities.

The new building will be accessible from three of the financial district's most important streets, Wall Street, Broad Street and Exchange Place. The building will have entrances on each of these streets.

The main building will be equipped with 20 passenger elevators and two freight elevators. The placement of the building's elevators and the arrangement of corridors adds much to the convenience of tenants and customers and a solution has been found in this building to the serious problem of congestion which is often found in a busy building where groups of elevator passengers wait in corridors through which people are passing constantly. Each group of elevators will be placed in a blind corridor and no one need enter or leave a corridor unless using the elevators installed there.

The Equitable Safe Deposit Company will have light, well ventilated offices in the basement of the building. It is planned to go down to bed rock with the second basement in order that the company's vaults may rest on bed rock. It is estimated that these vaults will be in the neighborhood of 60 feet below the earth's surface.

The architects are Trowbridge & Livingston and the builders the Thompson Starrett Company.

The Park Lane Apartment Hotel, St. Louis

Preston J. Bradshaw, Architect

The Park Lane will be Spanish in design, 21 stories high without the tower, faced with cream colored face brick and terra cotta with red Spanish tile roofs.

The entire lower floor will be given over to an arcade with lounging rooms, small banquet rooms, an intimate theatre of 800 seats, and various small shops with the entrances and exhibit windows visible only on the interior of the corridors and arcade.

It is planned to have 250 kitchenette suites and 300 hotel rooms of generous dimensions, all ensuite with large dressing rooms and spacious baths.

Six elevators will supply the needs for passenger service and freight delivery.

On the second floor will be two large terraces for summer lounging and a series of large sized meeting rooms for the various women's organizations that have agreed to take space in this building. There will be also a collegiate wing for the use of traveling graduates of various universities. This will be equipped with reading rooms and various other facilities for their exclusive use.

There will be three floors for the exclusive use of women guests with parlors, and general arrangements for their comfort.

The upper floors will be given over to studio apartments with living rooms two stories in height. These apartments will contain two, three, four and five bedrooms with baths adjoining.

The cost of the structure including furnishings and ground will be $5,000,000.

ART SUPPLEMENT *of* NOTABLE ARCHITECTURE

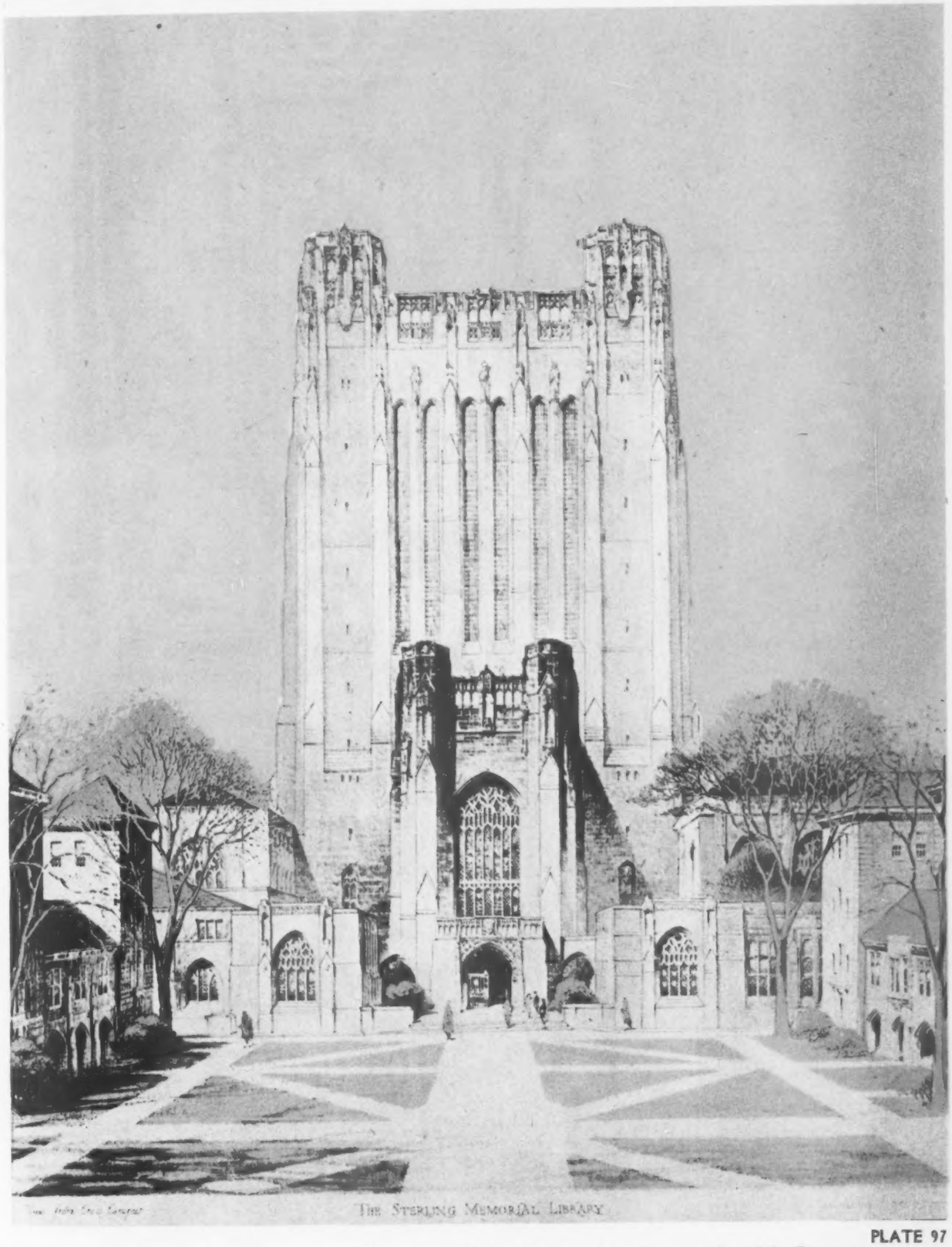


PLATE 97

The STERLING MEMORIAL LIBRARY, Yale University; James Gamble Rogers, of New York, Architect.

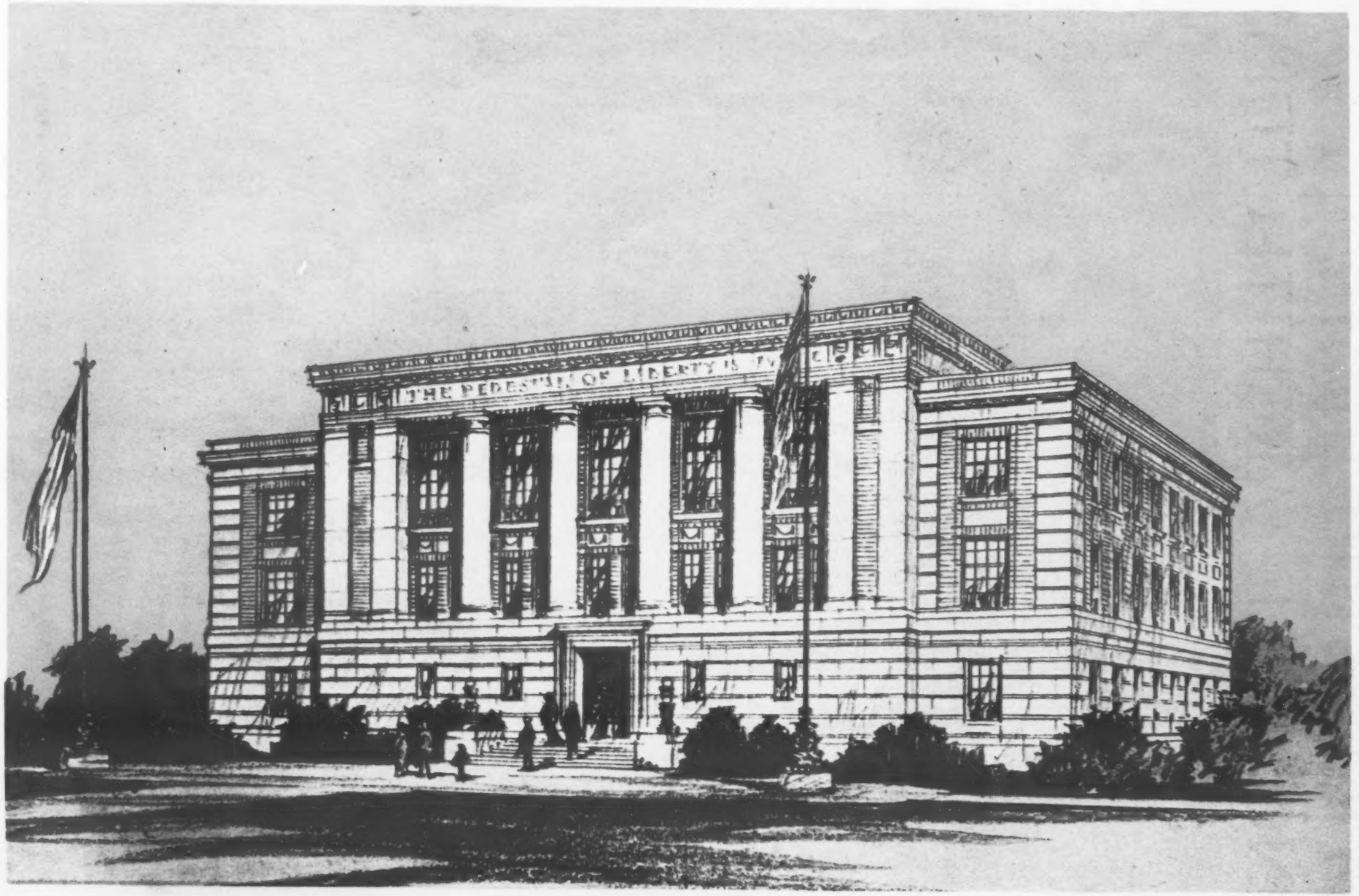


PLATE 98

The SPINK COUNTY COURT HOUSE, Redfield, South Dakota; Toltz, King & Day, Inc., of St. Paul, Minn., Architects.

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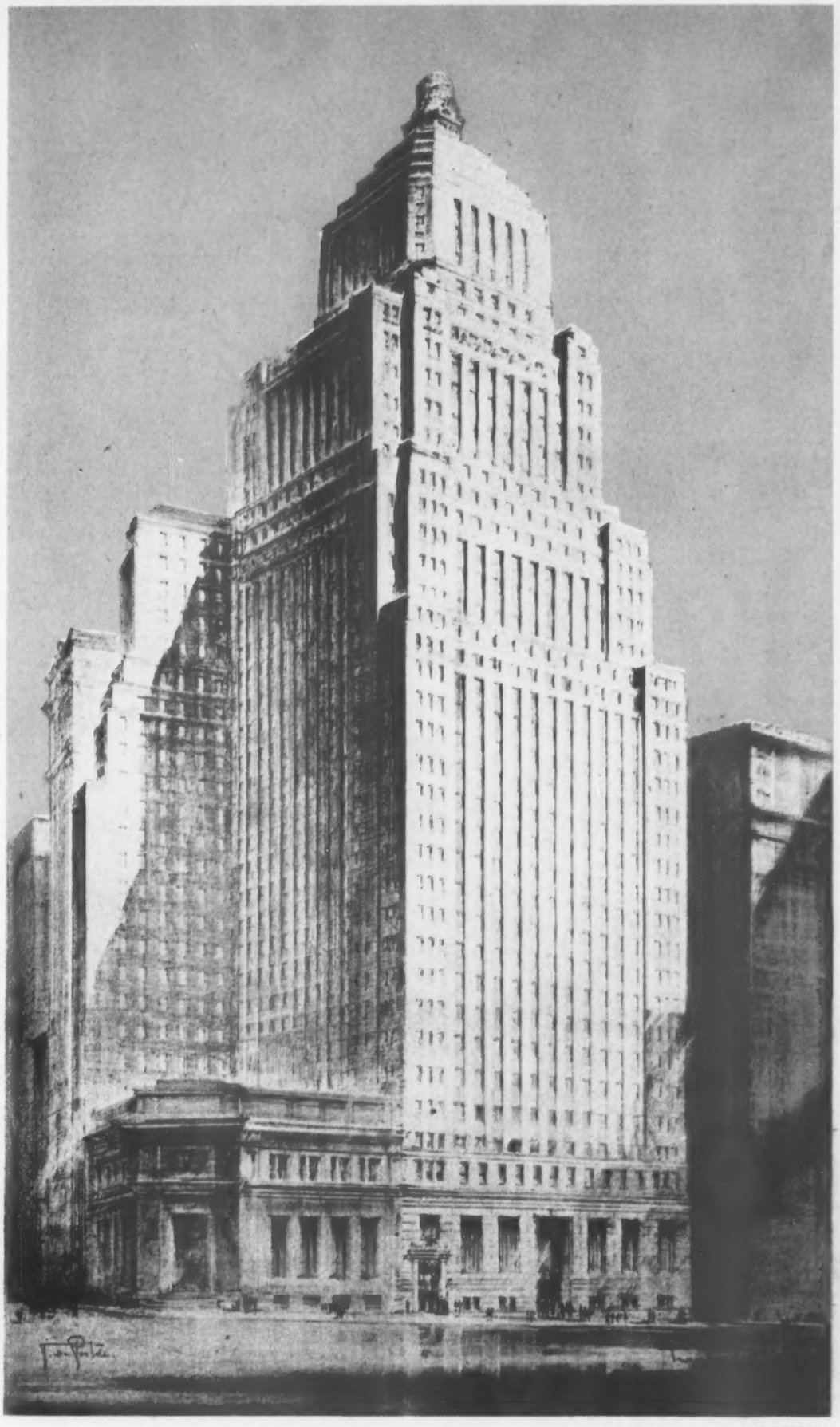


PLATE 99

The NEW EQUITABLE TRUST CO. BUILDING, Broad Street, New York City; Trowbridge & Livingston, of New York, Architects.

PLATE 100

The PARK LANE APARTMENT HOTEL, Spring and Linden Avenues, St. Louis, Mo.;
Preston J. Bradshaw, of St. Louis, Architect.

Church Building in New York

By HUBERT VAN VECHTEN

NOT very many years ago a view of Manhattan from the river revealed a city skyline broken by churchly minarets, tall spires holding lofty heads high above the jangling of the streets. Then someone learned how to roll steel beams, and New York became a city of skyscrapers. Apartment houses and office buildings shot up, ten, twenty, thirty stories high, and the churches found themselves in stone canyons, overshadowed on every hand.

That was yesterday. Today a movement is on foot in New York, and in other cities as well, which is leading to the construction of larger and very much taller church buildings, a movement which the men who build churches are watching with interest. During the two years 1922 and 1923 seventeen new churches were built in Manhattan alone, at a total cost of $2,241,000.

Among the larger churches, the most remarkable is the Broadway Temple to be built on Broadway between 173rd Street and 174th Street by the Methodist Episcopal Church. It will be a mammoth structure covering an entire city block and rising forty-five stories from the street, with a tower 719 feet above tidewater. From the top of this tower a shining cross thirty-six feet high will blaze with electric light, a landmark by day and by night for miles about, and a beautiful expression of spiritual supremacy.

Directly underneath the massive tower will be located the main auditorium of the church, seating more than 2,000 persons, and entered from the street through an impressive arched portal fifty-two feet high, of richly carved and pierced stone. Beneath the auditorium and extending under the wings on either side will be the Sunday School rooms and other features that will provide facilities for the varied activities of a present-day church, while over the auditorium will be a gymnasium and a large swimming pool. Thus the church will occupy the lower part of the tower and the basement space under the two wings.

From the gymnasium upward the tower will be a complete modern hotel, the lower stories given over to the hotel offices and to the public rooms, such as lobby, dining room, cafeteria, etc., and those above to some six hundred guest rooms. The gymnasium and swimming pool, lying between the church and the hotel, will be available for use in connection with both. There will be thirty-six stories in the tower from the sidewalk to the bottom of the observation tower, which will count as three or four more stories. In the steeple above this will be two floors of apartments, and still higher two floors devoted to machinery rooms. Highest of all, in the pinnacle, will be five or six stories of space that has not yet been assigned to any purpose.

At either side of the tower and forming part of the mass of building will be two complete and independent apartment houses divided into housekeeping apartments of from two to six rooms. In those portions of the building, along the Broadway front, will be stores which will be rented.

As Columbia University is planning to put up a branch college in the vicinity of the Broadway Temple, where eight thousand men and women will be studying, it is expected that rooms in the tower will serve the university well by providing living accommodations for many of these students.

The Broadway Temple Will Tower More Than 700 Feet Above the Street Below and Its Shining Cross Will Serve as an Inspiring Landmark for Miles in Every Direction.

The Broadway Temple will be not only self-supporting, but, from the rental of its apartments and stores and the income from the hotel, will actually make money for social and benevolent purposes. Ewing, Bacon & Henry, real estate experts, estimate that the annual income and expenses will be as follows:

Annual Income from Stores	$ 27,500
Annual Income from Apartments	166,290
Annual Income from Hotel	402,300
	$596,090
Expenses for Operating	$150,000
Taxes	110,500
Interest on $4,000,000.	210,000
	$470,590

Net surplus to be used in retiring bonds—$125,500.

The location of the Broadway Temple on the highest point in Manhattan together with its height of forty-five stories, its impressive massing of architectural forms and its size, occupying as it will 26,000 square feet of ground area. will make this most modern of churches one of the most striking features of the metropolis.

The architect of this remarkable building was Donn Barber, who was the architect of the new Cotton Exchange, the National Park Bank, the

Lexington Avenue Y. W. C. A. and many other important buildings. The Broadway Temple is the crowning achievement of his professional career for his death occurred suddenly only a short time ago and the men associated with him in the designing of this structure which marks a new epoch in church building are carrying forward the work to completion.

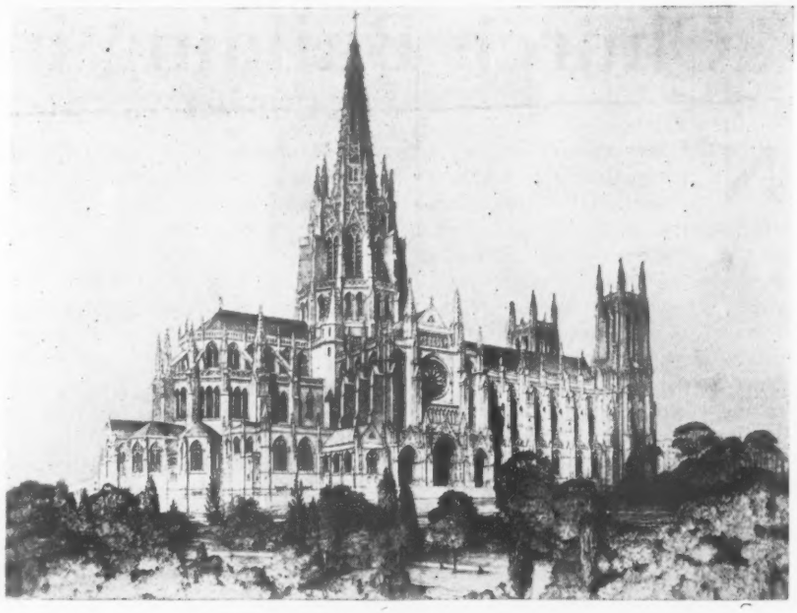
The story of the working out of this unique problem in design was told to the writer by one of the men closely connected with it as follows:

"After the four units—namely the church, hotel and two apartment houses—were decided upon, the problem arose of massing these units together. This may be regarded as the first step in the designing, the study of the general mass. The natural solution was to flank the church with the apartments and to surmount it with the tower containing the hotel.

"The second step was determining the shape of the tower, and for structural reasons (in order to span over the auditorium like the legs of the Eiffel Tower) it was made square with four slender towers engaged at the corners. This also gave the whole mass of the tower sufficient girth for good appearance, whereas if it had been simply made square it would have appeared too slender for the base.

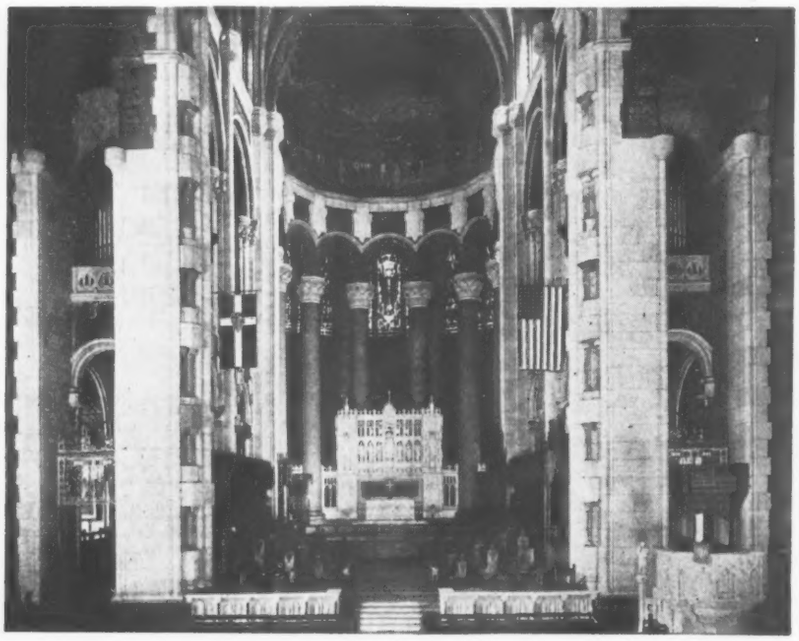
"The third step was the solution of the asymmetry of the lot, and it was by far the most difficult part of all to overcome the handicap of a lot with one side at a considerable angle to the other sides. To solve this problem recourse was had to models made at a scale of 1/32 inch to the foot and through a study of these models the solution was finally worked out as follows: The corner tower nearest the acute angle of the lot was made larger than the other three, thereby (this is the theory) shifting the center of mass nearer the center of the lot. To put it another way, the enclosing outline of the tower became similar to the shape of the lot.

"Then came the fourth step in the problem, the expression of the building. As the church was the guiding factor, the *raison d'etre* of the thing, it was finally decided to express the ecclesiastical function of the building, both from the street (by the church and its entrance) and from the distance, by shaping the tower to suggest the spire of a cathedral. We have to use the language everyone will understand, no matter how eclectic we may wish to be.



The Cathedral of St. John the Divine, Morningside Heights, New York City, as It Will Appear from the North, When Completed.

"The fifth step in the designing, the consideration of detail, constituted the rest of the problem. It is not at all a special problem, but one that has to be solved in every building. In this case a considerable eclecticism has been attempted in the character of the ornament which has been drawn from many sources. No ornament, practically spreaking, occurs above the first five floors. The embellishment of the upper part, high above the eye level depends entirely upon mass, openings and certain patterns, at large scale in materials. The organism of this building is so complex that it is difficult to give a detailed analysis of its design, but in general it may be said that its success depends upon its mass and silhouette, and upon the rich band made by the ornament and architectural forms encircling the center building for the height of its first three stories, also upon the effectiveness of the central entrance arch framing a very elaborate motive of pierced stone. It will be observed that an effort has been made to keep all elaboration of detail within the range of vision from the street and to depend upon the form of the building to count at a distance. This has a general application, being dictated both by economical and aesthetic consideration."



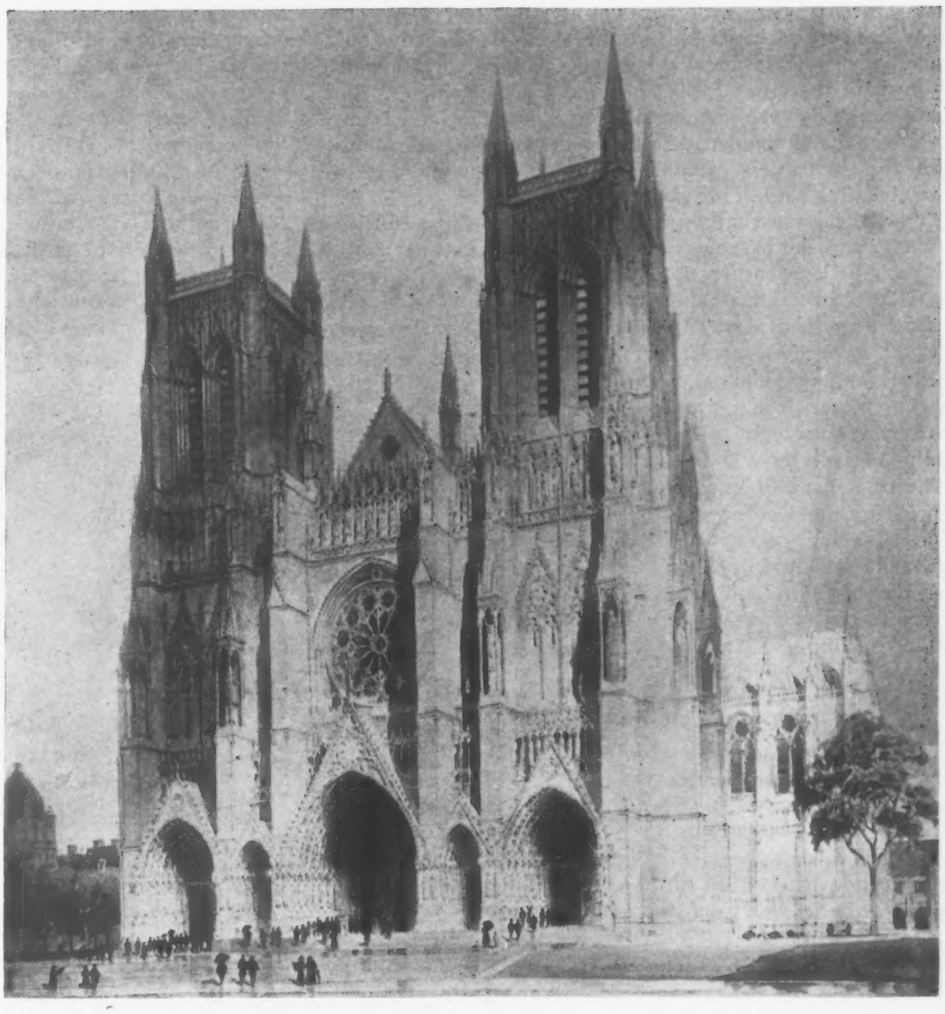
Present Interior of the Cathedral of St. John the Divine, Looking Toward the High Altar. The vaulting above the chancel is temporary and when the choir is remodeled the roof will be much higher.

The stupendous work of erecting what will without doubt be recognized by posterity as not only the largest but the noblest religious edifice of our day, the Cathedral of St. John the Divine, was resumed on May 6th of this year after the lapse of many years, for though the last work was done in 1916, the carrying forward of the building stopped about fifteen years ago and the only work done after that time, much of it temporary, was for

the purpose of making usable the portions already partly built.

Now the new design that is the outcome of the study given to the problem by Ralph Adams Cram since his appointment as consulting architect to the Cathedral fourteen years or so ago is being carried forward towards realization. The completion of the Cathedral of St. John the Divine will cost $15,000,000, of which $10,000,000 now is assured as the result of a campaign for subscriptions culminating in a great drive last year.

The contract for the construction of the Nave was awarded by Bishop Manning and the Board of Trustees to the New York building firm of Jacob & Youngs. The nave, exclusive of the west facade and towers is to cost $5,376,330. Jacob & Youngs are also the builders of the Baptistry, a separate building, upon which work was begun in the spring of 1924. The Baptistry is to cost $250,000, and is the gift of the Stuyvesant family.



The Proposed West Facade of the Cathedral of St. John the Divine from a Drawing by the Architects, Cram & Ferguson, of Boston.

This means much more than the taking up of the work where it was laid down, for it is not a continuation of the more or less chaotic conditions that existed from the time the cornerstone was laid in December, 1892, until the suspension of work in 1916. It means a new start, the beginning of work in accordance with a great new design and while comparatively little of the old work will be destroyed, nothing will be spared that cannot be brought into harmony with the big new composition. Dr. Cram has not only produced a great design, but has also shown remarkable skill in incorporating the existing work in his design with a minimum of loss. The architects of the Cathedral are Cram & Ferguson, of Boston and New York.

The existing work is the result of innumerable compromises, modifications and revisions. It represents neither the original design of Heinz & La Farge (who were named in 1891 as architects of the Cathedral as a result of a competition) nor the ideas of the trustees—a condition so inharmonious and full of infelicities of design that a fresh start was necessary.

The original design by Heinz & La Farge showed an exterior that was French Romanesque in mass and detail treated internally in the Byzantine style. The trustees considered this combination of styles forced and incongruous and they instructed the architects to revise the design. From that time on it was a matter of continuous compromise until work stopped and temporary closer walls and other expedients were adopted to make the portions already partly built usable until such time as the work might be properly resumed.

The new design is mainly French Gothic in its inspiration, this style having been chosen rather than the English Gothic, because the long, narrow churches of the Gothic period in England have not the amplitude and do not build up into the impressive tall mass required for the Cathedral of St. John the Divine, in its commanding location and with its significance, while many fine examples of Gothic architecture in France show these characteristics. Dr. Cram has wisely introduced elements from other sources than French Gothic inspiration when called for by the problem, for instance, the west towers, instead of having the square tops that are a familiar feature of French Gothic architecture, have the pinnacles of English Gothic. This choice was dictated by the fact that square topped towers as wide as these would appear oppressively heavy, and the pinnacles relieve this effect. Again the great central spire over the crossing is related to certain German spires and to the spire of the great Cathedral of Burgos in Spain, rather than to any French Gothic prototype.

In harmonizing the old work with that to be built the roof of the choir and the semi-dome in the crossing will be replaced with French Gothic vaulting and other changes will be made in the old work.

In point of size the Cathedral of St. John the Divine will be the third largest in the world, St. Peters in Rome, stands first and the Cathedral of Seville, Spain, second. It will be the largest in the English-speaking world.

The top of the cross on the great central spire will be 500 feet above the ground, 631 feet above tidewater. The total length of the Cathedral will be 601 feet. The west front will be 220 feet wide, including buttresses. The towers will be 265 feet high and fifty feet square. The width, measured from the exterior wall of the north transcept to that of the south transcept will be 315 feet.

The crossing vault will be two hundred feet above the floor. There are seven beautiful chapels already built radiating from the ambulatory and the great organ which is in place there has 7,000 pipes and a set of chimes. The new design for the Cathedral is of a granduer and beauty that commands the deepest respect and the greatest admiration for the bigness of conception, the scholarship and the architectural skill it displays.

One of the most interesting and beautiful of the churches built during the past few years is the Park Avenue Baptist Church at the corner of Park Avenue and 64th Street. It shows an original and practical solution of a modern problem in such a way that the traditions of ecclesiastical design have been preserved. In this case the program called for the building of a church, parish house and a Sunday school on a lot, only 80 feet by 100 feet. The customary practice of spreading these portions of the building along the ground was obviously out of the question and they were placed one above the other, resulting in a building of commanding height and simplicity of mass, so treated as to architectural features and details that it is beautiful and of marked churchly dignity. The men's society rooms were placed in a high basement, the portion marked by the height of the aisle motive is devoted to the church auditorium, while the women's society rooms occupy the clere story, and the Sunday school is housed in the roof. These floors are all served by two large elevators and a stairway that make them easily accessible. As there was not space for a deep monumental entrance the main portal was placed in the front wall at the right, opening into a vestibule directly back of which are the staircase and the elevators. Extending across the front of the building to the left from this vestibule is the narthex or wide passage from which the auditorium is entered through three double-swing doors. At the end of the narthex opposite to the vestibule is a secondary stair hall with a minor portal opening upon the side street at the corner of the building. The narthex lies below the large nave window that is the main feature of the front of the church. At the right and left of this window are buttresses that are necessarily of slight projection because of the limited lot space, but that are given the necessary massiveness by their unusual width. The nave window is subdivided by two minor buttresses that prevent any bad effect from placing so large a void as this window under so much massive masonry as lies above it, for these buttresses give a sense of support and preserve the plane of the wall in this opening. Their pinnacles carry the lines up and connect them with the motives above, emphasizing the perpendicular character of the front and helping to tie the whole together. The satisfying unity of this front is due mainly, however, to the fact that the features are well related and properly proportioned. The proper handling of the enrichment is to be commended, the use of plain surfaces, of good texture and of comparatively simple mouldings as a foil for the more ornamental details. Over the main portal are church offices the windows of which have been made to count in announcing the entrance and at this corner of the roof springs the octagonal belfry with its traceried openings, pinnacles and rich crown of pierced stone. A complete chime of bells is to be placed here at a later time.

Along the 64th Street side the wall is divided by buttresses and pierced by a row of tall windows terminating in lancet arches. The apparent length of this wall has been increased by the subdivision of the space under each of these arches into two windows with lancet heads. The buttresses, the depth of the windows and their subdivision have been well studied to avoid any sense of plainness here.

"One of the Most Interesting and Beautiful of the Churches Built During the Past Few Years Is the Park Avenue Baptist Church."

The interior of the Park Avenue Baptist Church is interesting and beautiful. Work upon it is still under way though the first service was held in the church April 9, 1922. The church is in stone finish, lofty piers supporting vaulting over nave, aisles and chancel. In keeping with the design of the exterior, the interior has the character of old European churches. There is no trace of the type of interior arrangement so frequently found in non-ritualistic churches. The bowled floor, the raised platform for the speaker are notable by their absence and in their place are a level floor, a chancel and an elevated pulpit, a return to older traditions in church design that has much to recommend it.

The stained glass in the Park Avenue Baptist Church is of special interest. The west window, the nave window in the front, consisting of six lights with tracery was designed by Henry Wynd Young. It depicts six figures of historical importance in the Baptist Church, namely, Milton, Bunyan, Carey, Williams, Judson and Wayland. Below these figures are medallions typifying the life work of each of these men. The window as a whole is in grisaille with notes of fine color. The chancel windows are of old stained glass dating from the first half of the Sixteenth Century. This glass probably came originally from that part of Flanders lying between Burges and Antwerp, as the drawing, painting and the colored glass—notably the purples and brownish pinks—all suggest North Flemish work, rather than glass from the South or West of Flanders. These panels probably all came from the same church, although painted by different hands, as they are all of the same size and the figures are of one scale. They were acquired by Sir Thomas Neave (about 1800) and from 1809 to 1922 they were carefully stored away at the ancestral home of Sir Thomas Neave, Dagnam Park, England, together with the small panels, medal-

"The Churches Found Themselves in Stone Canyons, Overshadowed on Every Hand." Trinity Church Surrounded by Office Buildings, from a Drawing by Theodore de Postels.

ions and fragments, now in the tracery.

Another feature of the interior worthy of special attention is the communion table. The general design was suggested to the architects by an old Spanish table in the Morgan Collection at the Metropolitan Museum of Art. It was decided to place at the base of the table carved figures of the twelve disciples who partook of the Last Supper. It so happened that the arrival of the Oberammergau players in New York presented an unusual opportunity to give additional interest and value to these figures and it was arranged that the figures should be carved by them upon their return home.

The architects of the Park Avenue Baptist Church were Henry C. Pelton, New York, and Allen & Collens, Boston, associate architects. Eidlitz & Son, New York, were the builders, and the chief engineers engaged in the construction were: foundation, Moran, Maurice & Proctor, New York; structural, J. Lowenstein, New York; mechanical, H. Hall-Marshall, New York. The cost of the building is said to be well over one million dollars.

Interior of the Church of All Nations Which Conducts Extensive Community Work Among the Many Different Nationalities of New York City's East Side.

A large church which is being planned for New York is the Church of the Heavenly Rest, which will stand at 2 East 45th Street. According to all the information that could be obtained, the cost of this structure will exceed a quarter of a million dollars.

Two other tall churches are soon to be built in New York, both of which will dwarf the surrounding buildings. The Church of Our Lady of Solace, which is to be erected on Mermaid Avenue in Coney Island, will be the tallest building on the coast visible far out to sea. The tower will be as high as a fourteen-story building. P. J. Hoey is the architect, and the structure will be completed at a cost of $200,000. The other church is the Hanson Place Methodist Episcopal Church in Brooklyn, a "skyscraper church" which will cost $1,600,000. Helme & Corbett are the architects.

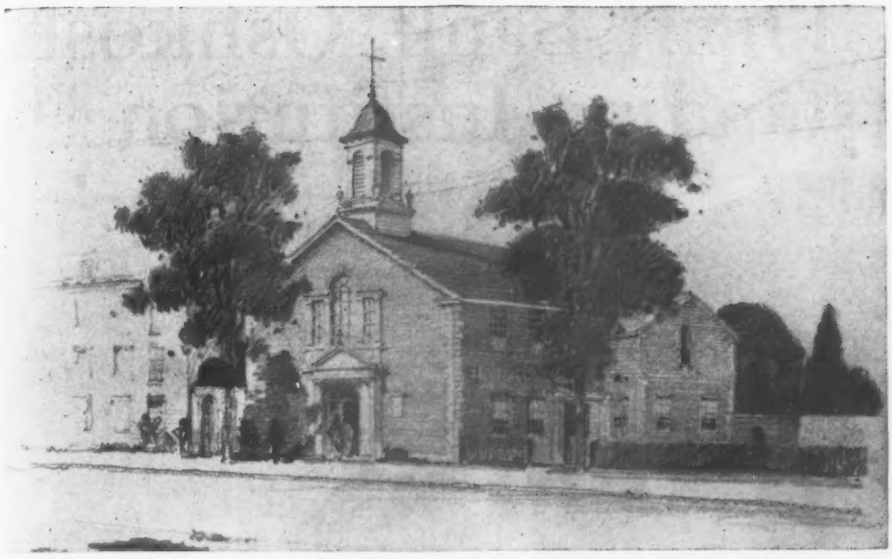
These churches will stand as examples of the larger trend church architecture has taken in New York. There are a number of smaller churches, however, which are being built in various neighborhoods throughout the city.

Five new church buildings are being planned by the Congregational Church and will be completed as soon as possible. These churches will be at the following locations: Ocean Avenue, Brooklyn, to be built at a cost of $50,000, architect, H. D. Verham; the Nazarene Church (colored), Brooklyn, cost, $100,000; the Rugby Church, Brooklyn, cost, $50,000; Grace Church (colored), Harlem, cost, $50,000; First Congregational, Rockaway Beach, cost, $70,000; Westchester (Green Ridge) Church, at White Plains, cost, $75,000. In addition to these, the Van Wyck Avenue Church at Jamaica was completed in May, 1924, at a cost of $30,000, and in New York City the Riverside Emanuel Church, for which the building was bought, adds $60,000 to the total.

The Church Extension Committee of the Presbyterian Church is planning to erect a large building at Fort George, at an estimated cost of $250,000. This is expected to be the community church of upper Manhattan, and, like the Cathedral of St. John the Divine, is receiving contributions from persons of various denominations. Upon completion of the proposed church, the present chapel will be used for Sunday School and Parish House purposes, with the space between it and the new church building occupied by classrooms for the primary and junior departments. Under the church auditorium on the main floor will be a large banquet hall and basket-ball floor, with a ceiling height of eighteen feet, a kitchen, and two pairs of bowling alleys. Above the main floor space will be provided for clubrooms and social gatherings. The architect for the Fort George Presbyterian Church is Clarence Wilson Brazer, architect for the Presbyterian Church Extension Committee.

A Swimming Pool, the Gift of Mrs. Grace Rainey Rogers, Is a Part of the Community House and Church of All Nations.

The Wadsworth Avenue Baptist Church, recently built at 184th Street and Wadsworth Avenue, consists of three floors and a basement. On the club room floor are men's, women's, and girls' rooms, with a special room for the Girl Scouts; on the main floor are the auditorium, the chapel, the pastor's study, and class rooms for the be-



The Epworth Methodist Church (Colored) Is One of the Interesting Church Buildings Which Have Been Erected in New York City in Recent Years.

ginners and primary division of the Sunday School; on the class room floor, besides the assembly halls and class rooms for the Sunday School juniors and intermediates, are the organ, choir room and balcony. The basement is fitted up with a gymnasium, a kitchen, and a Boy Scouts' room. The operating architects for this church are Ludlow & Peabody, 101 Park Avenue, New York, and the consulting architects are those of the Architectural Bureau, American Baptist Home Mission Society.

Three new Methodist churches have just been built in New York City, and another is now in course of construction in Yonkers. The Church of All Nations, at 9 Second Avenue, was completed in the spring of 1923. The architect for the church was Julius Gregory, New York, and the general contractor the William Kennedy Construction Company of Brooklyn. The cost of this building, exclusive of the land, was approximately $360,000, which with the reconstruction and improvement of the adjoining building at $45,000, made the total $405,000. This includes a fully equipped church and neighborhood house, with a chapel, gymnasium, swimming pool, club rooms and kindergarten rooms for the extension work which this church organization is conducting among the people of many different nationalities in this district of the East Side.

The Epworth Methodist Episcopal Church (colored) is at the corner of Morris Avenue and 160th Street. The architect for this building is James C. Mackenzie, Jr., 4 East 39th Street, New York. This building was erected at a cost of nearly $50,000.

Another interesting Methodist church is the Italian Church of Our Savior, now being built in Yonkers, New York, at an estimated cost of $60,000. The architect is Mr. Ross, of Ross & McNeil, New York City.

Riverside Synagogue, situated at 310 West 103d Street, which was dedicated March 1, 1925, is the only synagogue in the Broadway district between 100th and 116th Streets. It is not yet complete, but when finished will contain an auditorium with a seating capacity of 750, and class room accommodations for 350 pupils, with club house facilities for social events. The cost of the building is expected to total in the neighborhood of $250,000. The architect is Maxmillian Zipkes.

During 1923 plans and specifications were filed for the building of nine new churches in the borough of Manhattan, at a total estimated cost of $1,516,000; and plans were filed for the alteration of twenty-three other church buildings, the alterations to cost $162,202. According to the report of the Bureau of Buildings for the borough of Manhattan, the following illustrates the number of church edifices built and their costs, during the years 1918 to 1923. Figures up to 1925 are not available but the foregoing story indicates the type and kind of building carried on.

Year	No. of Buildings	Cost
1918	2	$ 150,000
1919	5	683,000
1920	1	60,000
1921	11	1,305,000
1922	8	725,000
1923	9	1,516,000

The following is the number of churches that underwent alterations during each of these years:

Year	No. of Buildings	Cost
1918	22	$ 85,425
1919	30	143,850
1920	34	494,500
1921	25	352,740
1922	26	229,100
1923	23	162,202

Ecclesiastical architecture has developed rapidly in America since the opening of the present century until the churches that are being built today show evidence not only of architectural skill, but of its blending with the spiritual element inherent in the church itself.

In so colossal an architectural work as the Cathedral of St. John the Divine, the design is naturally developed in harmony with the principles exemplified in the great cathedrals of the old world. In the Broadway Temple, on the other hand a new problem has been handled by the application of the same methods employed in designing other tall modern buildings and in accordance with the thought expressed in the words of Donn Barber, its architect, "by physical dominance alone can adequate expression be given to the idea of spiritual dominance."

The Park Avenue Baptist Church by Henry C. Pelton and Allen & Collins is an example of a different handling and the solution of the problem of a church of comparatively small size in agreement with the best traditions of ecclesiastical architecture. A few years ago it was customary to treat a church of moderate size more or less like a miniature cathedral, with a relatively large tower or sphere, everything about it being necessarily inadequate for that treatment.

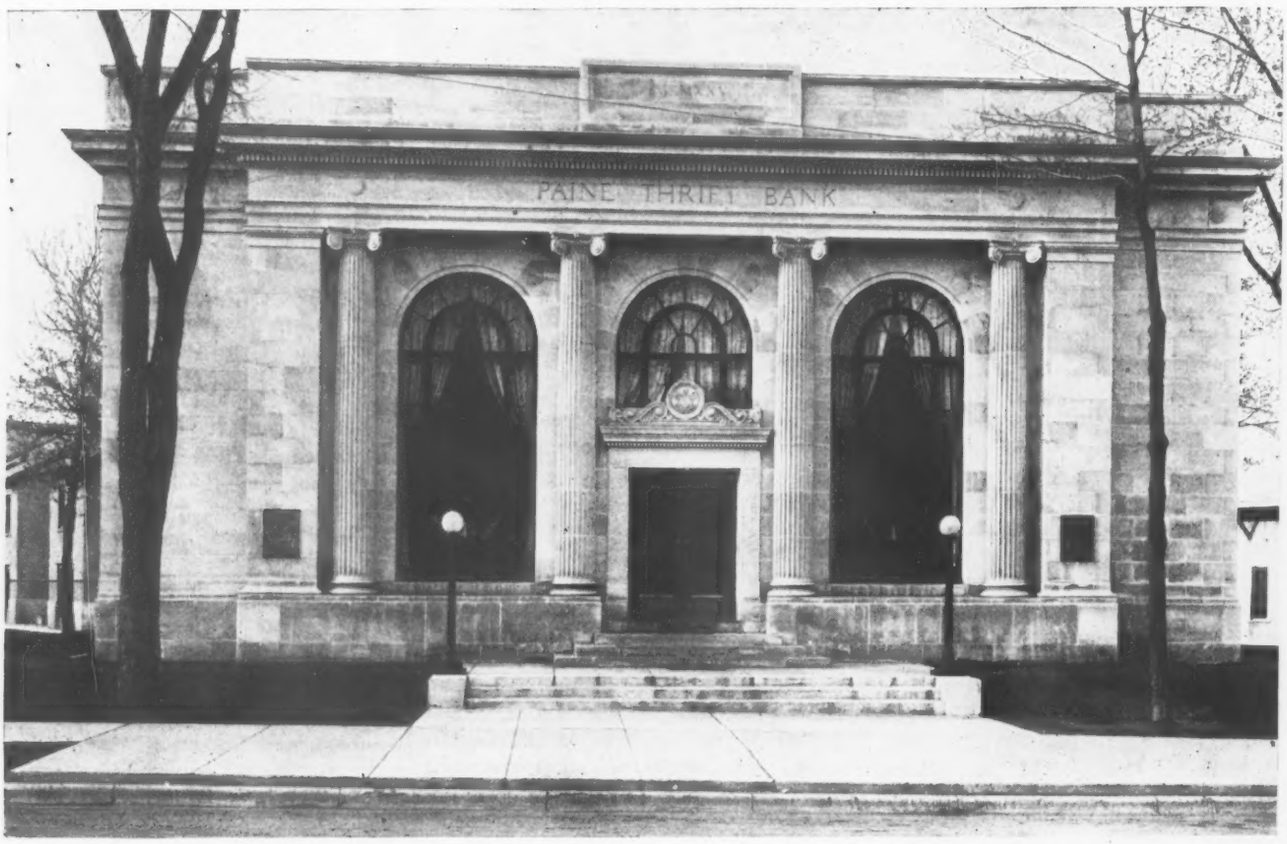
The new and better way is exemplified in the Park Avenue Baptist Church which is designed as though it were a small part of a big cathedral, one of the chapels perhaps; consequently it has dignity. Even smaller churches than this used to be designed on the lines of big churches, photographed down with very bad results. Now it is a growing practice to find in the simple and often delightful meeting house of early days, the prototype of the design for the smaller church, such as the Epworth Church.

The thoughtful and earnest effort being expended upon church design and church building, the originality, and the scholarship being devoted to this work by architects is giving us churches well adapted to the various conditions existing in different communities throughout the country and expressing beautifully and with dignity the spiritual lift of the present day.

✣

"PRETENTIOUSNESS is out of place in the small house design. Features which are solely ornamental are unsuitable wherever the requirements are strictly utilitarian. To avoid extravagance every effort should be made to strengthen the principle of small house design. This principle is simplicity."

The Paine Thrift Bank, Oshkosh, An Outstanding Institution



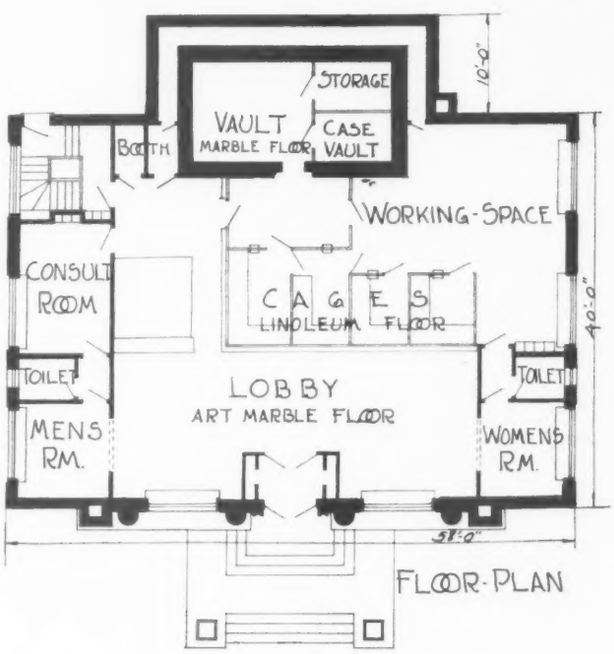
A Real Asset to the Community, Not Only Architecturally but as an Institution, the New Paine Thrift Bank Stands as One of the Most Impressive and Handsome Buildings in This Wisconsin Millwork City.

FOR many years Oshkosh, Wisconsin, has been noted as a center of the lumber and millwork industry and it is, today, one of the livest and most attractive small cities in the United States. As might be expected, the visitor in Oshkosh will see many fine buildings, either newly completed or under construction, but none will leave him with a more vivid impression of beauty and permanence than the recently completed home of the Paine Thrift Bank.

This bank is the latest of a number of activities which have been undertaken under the leadership of Nathan Paine, president of the Paine Lumber Company, of Oshkosh. In commenting on its organization, Mr. Paine has said: "The bank is only one thread in the warp and woof of the tapestry which, it is hoped, will, in time, present a combination that will meet the approval of all the citizens of Oshkosh."

The new building is of Bedford stone and has a frontage of 58 feet and a depth of 40 feet, with an extension of 15 feet to house the concrete reinforced vault at the rear. The entire picture which it presents is one of solidity and dignity with none of the coldness so frequently associated with banks. Its cost was approximately $70,000 and it is a piece of work of which the architects, Auler & Jensen, of Oshkosh, as well as Mr. Paine, may feel proud. The actual work of construction was capably handled by C. R. Meyer & Sons, Oshkosh contractors.

From the front, this building presents an appearance which suggests a library more than a bank, and yet, at the



The Interior Contains All the Working Features of a Modern Bank with Provision for Personal Service to the Customers.

same time, is entirely in keeping with the best ideas of bank architecture. The entrance is truly imposing and the interior delightfully attractive. There are windows on three sides of the building, a condition rare in banking houses which are usually crowded in between other business structures. This is made possible by the location of the building, almost directly opposite the offices of the Paine Lumber Company, with a generous set-back from the street.

While the structure has no second story, the ceiling is lofty and ornamented with an art glass skylight and is provided with electric lighting facilities which add to the rare beauty and attractiveness of the interior. Handsome draperies have been provided at the windows, the walls are finished in Tiffany, oil paintings, bronze figures and plants enhance the beauty of the spacious lobby and remove all that "cold cash" ap-

The Lobby and Tellers' Cages Are Fully Lighted by a Beautiful Art Glass Skylight Above.

At the Rear Is the Working Space with the Entrance to the Concrete Reinforced Vault in the Center.

pearance which marks the average bank.

All this, however, is only a portion of the special interest which is to be found in this bank. As outlined by Mr. Paine, the bank was organized for special service to the employes of the Paine Lumber Company and the community.

"The cashing of pay checks, because of their large numbers, has been a burden to merchants and an inconvenience to employes, the majority of whom live two miles from the nearest bank," says Mr. Paine. "In providing for such service, it seemed wise to include general banking facilities and expert advice to wage earners on the investment of savings, so that the earnings of years might not be sacrificed in ill-advised investments.

"A splendid equipment of safety deposit boxes offers every safeguard for valuable papers. In the belief that a higher rate of interest on deposits would encourage thrift in savings and discourage speculations that usually return a loss, it was decided to pay 4 per cent interest on savings accounts, as compared with 3 per cent paid by other banks in the vicinity."

The officers of the bank are: President, Charles Nevitt; vice-president, John Geiger; cashier, Fred Loker; assistant cashier, Otto F. Vollmer. All of the directors and nearly all of the stockholders of the Paine Thrift Bank are employes of the Paine Lumber Company. The directors are: H. M. Bacon, Glen Converse, J. J. Davis, John Geiger, W. J. Manser, D. C. McCray, Charles Nevitt, E. W. Paine, H. C. Sawtell, Wm. L. Stothfang.

Oil Paintings, Bronze Figures, Plants and Window Draperies Join with the Tiffany Finished Walls to Remove the "Cold Cash" Atmosphere of the Ordinary Bank.

DETAILS OF HOME BUILDING

Hollow Tile

By V. L. SHERMAN,
Lewis Institute of Technology

WHEN I get rich, that is so rich that my lunacies will be spoken of as idiosyncrasies, I am going to build me a house of a certain kind of tile. This house will sit low on the earth and will rise up in a sort of warble of color; a key tone of slate gray, mixed with blue-black. That is to be the color of the walls. The roof will be a heavy flat blue tile reaching part way round two large chimneys of the same color in brick. The windows are to be all leaded casements, for I shan't wash them myself, and for the doors three or four heavy oak battens which I intend to steal. Or, if I am rich enough the house may require a real thatch roof.

Most of us are not rich, and many houses are built with a profit in the offing which, with the value of our neighbor's opinion, acts as a normal restraint confining our adventures to the charted areas. But my rambling has merely been around the fact that I like a tile house. One doesn't have to be crazy to build a tile house, but one may well be.

Generally speaking far more weight goes into the structure of a house than is necessary. One of the finest things in hollow tile is its comparative lightness. Thus it is not so likely to show local failures from its own weight as some walls are. And hollow tile walls, whether stuccoed or bricked or bare have great cellular advantages. By this is meant the large air cells within the tile and the possibility of insulating the inner surface of the wall from the outer when laying up the wall by stopping off the joints.

This last point may seem small to some but it is not. Any material containing unprotected capillaries or minute vessels will not only absorb moisture but will pick it up. The state of the inner portion of a wall then is governed by the amount of protection afforded by the outer portion. So far as mortar is concerned just try a piece and see, if there is any doubt. Now this pertains to the condition of moisture in the wall itself.

In the hollow tile asylum I intend to build for myself there is to be a heating plant which will deliver warm air within the wall. A sort of invisible heat to be admitted into the rooms through grilles in coves. This brings up another point in regard to tile.

Moisture in a wall and on a wall are two different things. The latter is called "sweat" probably because it does not come from within and because the surface is cold instead of warm. Any surface having a temperature lower than that which sustains the moisture in the air will collect its due of moisture from the surrounding atmosphere. For instance it is hard properly to humidify a house without storm windows because of the collection of frost on the panes in cold weather.

A wall of hollow tile is, or should be, dry within the house. No evaporation from its surface means no chilling from that source. The cells on the inner side, if furring is not used, are as susceptible to the house temperature and early morning warmth as the outer cells are to the weather. This reduces materially the chance of precipitation of moisture on the inner walls when the weather is damp but too mild during the day to run the heating plant.

Such action might be imperceptible if it did not leave an unforgetable odor. Even furring under plaster will not stop it and, except for climbing the stairs, that is my chief objection to basements. A cellar may be kept shut in warm weather and so protected from the moisture laden warm air, but a basement is to be ventilated.

Sitting down to draw up the sketches opposite it seemed hard to settle on the material. Hollow tile is apparently exposed too little in house exteriors. It has been suggested here that when procured of good color a smooth, bare tile wall is attractive. There are some in this country but more across the water. A hollow tile wall will take stucco to perfection. Such a house can carry flat stone trim along with the stucco and produce a very solid, attractive mien.

As shown in Figs. 4, 5 and 8 it is laid up bonded and patched with brick at the intervals. This particular case is limestone and white rough-cast stucco, but divergence of color is sometimes more attractive. The present case contrasts with a vari-colored slate roof. The tile is plenty strong enough to take care of itself. Fig. 6 is a specimen of contrast that is popular with some and readily obtained. I don't happen to like it.

Brick backed with tile is very substantial. The hollow tile furnishes its own air cell so the brick may be brought up on the outer surface with flat ties used, or as is often the case bonded in on short courses of tile. This bonding gives a texture to the wall which is very pleasing. Pleasing is the word, because the satisfaction in a bonded brick wall comes from association with old things.

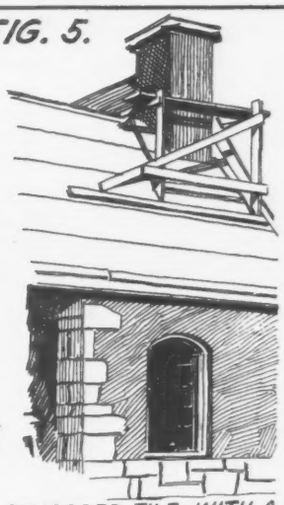
Fig. 1 is an isometric sketch of a house wall at the scale of 0.5 inch to the foot. This is one type of construction only. But there are two points to be noted. The roof, if of shingles, should be securely bolted to the walls. A hollow tile, or a brick wall has, of course no "give" upwards. This lifting strain is easily explained by noting the barometer on squally days. On a June day, when tornadoes were most promiscuous, the glass fell and rose nearly half an inch six times in 25 minutes. That meant nearly 30 pounds to the square foot difference in atmospheric pressure. If a house is closed these sudden changes do have an effect.

Figs. 2 and 3 are phases of hollow tile construction which interest me particularly. With timber joists the set at the plates must be substantial and the bridging brought close enough to the walls to prevent slackness at a border which is not boxed. Why not use slab floors? By means of hollow tile good concrete beams may be built as alternates

(*Continued to page 129*)

FIG. 4.
GROOVED TILE FOR STUCCO.
STONE TRIM. BRICK PATCHING.

FIG. 5.



STUCCOED TILE WITH A STONE BASE AND TRIM.

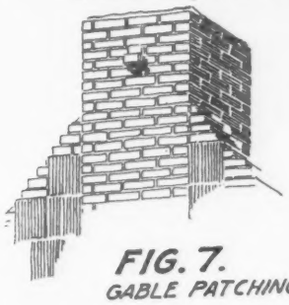


FIG. 7.
GABLE PATCHING.

FIG. 6.
BRICK, STONE, AND STUCCO.

FIG. 8. APPEARANCE OF WEIGHT WITHOUT HEAVY STRUCTURE.

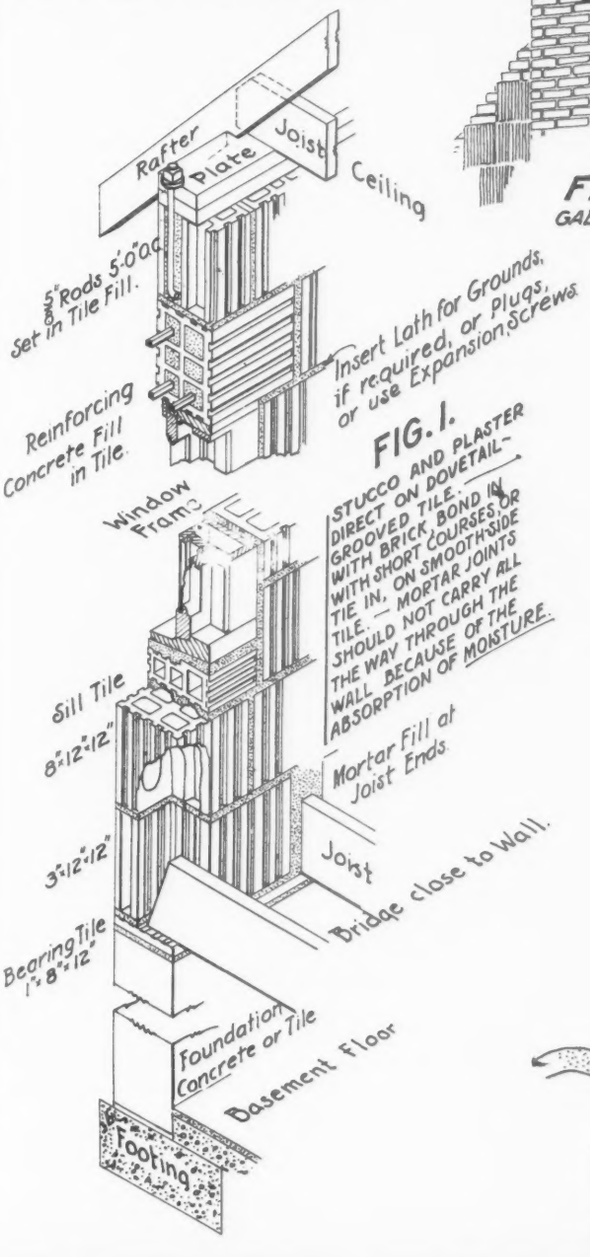


FIG. 1.
STUCCO AND PLASTER DIRECT ON DOVETAIL-GROOVED TILE. WITH BRICK, BOND IN WITH SHORT COURSES, OR TIE IN, ON SMOOTH-SIDE TILE. MORTAR JOINTS SHOULD NOT CARRY ALL THE WAY THROUGH WALL BECAUSE OF THE ABSORPTION OF MOISTURE.

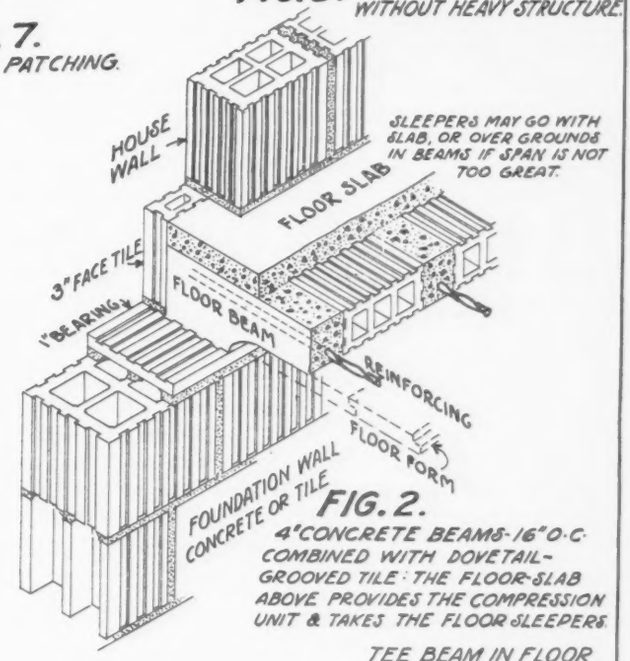


FIG. 2.
4" CONCRETE BEAMS-16" O.C. COMBINED WITH DOVETAIL-GROOVED TILE: THE FLOOR-SLAB ABOVE PROVIDES THE COMPRESSION UNIT & TAKES THE FLOOR SLEEPERS.

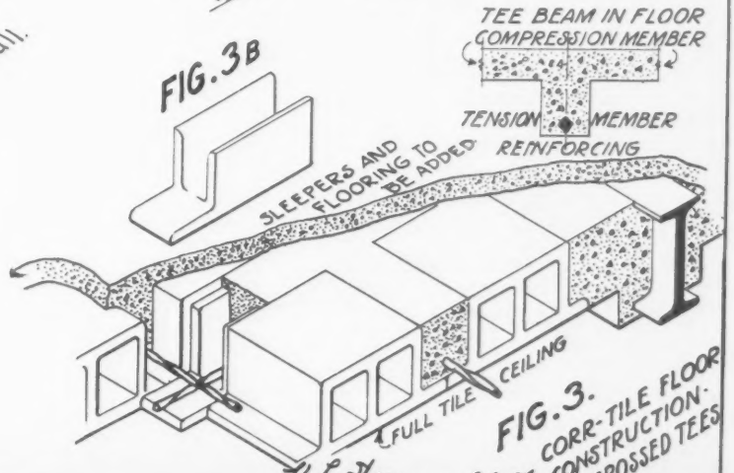


FIG. 3B

FIG. 3.
CORR-TILE FLOOR CONSTRUCTION: CROSSED TEES

V. L. Herman 1-6-26.

FURNACE HEATING

Forced-Air Heating

How Electric Fans May Be Used with Warm-Air Furnaces to Increase Efficiency and Save Fuel

This department by R. C. Nason, Heating Expert, appears every month in AMERICAN BUILDER

THE use of electric fans in connection with warm air furnaces has so many advantages that many furnace installers have called it the "missing link" in warm air heating. In practice, it means simply the installation of a small fan in the air-supply duct to increase the volume and rate of flow of air passed through the furnace casing.

When a hot surface is surrounded by cooler air, as in a furnace plant, the surface loses its heat in three ways; namely, by conduction, convection and radiation. In the first, the air immediately next to the firepot combustion chamber and radiator of the furnace becomes warm. Heat is then transmitted to the particles of air with which it is in contact.

As air is a poor conductor of heat it is best that the strata of air, after it has become warm from contact with the heating surfaces, be removed, thus permitting a new supply to take its place. This done, the total mass becomes heated. This is called convection.

Hot surfaces, such as radiators, emit heat rays similar to light rays from a luminous body. This process of warming is known as radiation and is the process of heating employed in steam and hot water heating.

In the warm air furnace the heat given off from castings by radiation is a total loss unless it can be saved by indirect methods. This is usually done by interposing a shield, such as an inner casing, but in furnaces the important heating process is that of convection.

As the air supply reaches the bottom of the furnace casing in a gravity, or natural circulation, system it is induced to rise and pass to the rooms above by the vacuum resulting from the difference in weight of the cool supply, which is heavy, and the warm air above it which, being lighter, has risen. The velocity of air flow is, therefore, dependent on the difference in temperature between the warmed air and the cold supply, the greater the difference the faster the rate of flow.

In cold weather the rate of combustion is high, warm air

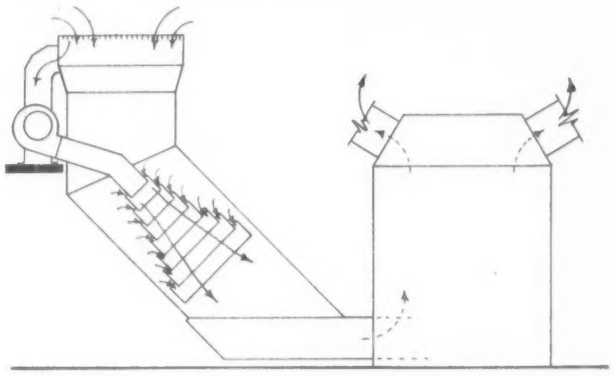


Fig. 1. Blower Fan with Concentric Ring Circulator for Increasing Flow of Air Supply in Furnace Heating.

register temperatures correspondingly high, hence the rate of flow is more rapid than on mild days. There are many days, when high winds and extreme cold, by increasing infiltration, make certain exposed rooms hard to heat with a gravity system because of inability of warm air to flow to such rooms. These considerations, combined with a desire to obtain good circulation when interior air is totally recirculated, led to the installation of electric fans in the cold, or return, air supply duct to increase the circulation by artificial means.

Certain tests made at the University of Illinois reveal important facts on the practical value of fans in furnace heating. It was shown, for example, that with an equivalent register-air temperature of 196 degrees Fahrenheit it was possible to force the furnace tested to a capacity of 328,000 British thermal units (B.t.u.) and maintain this register temperature.

Under natural circulation the corresponding capacity was 114,000 B.t.u. It was possible to increase the capacity from 114,000 to 204,000 B.t.u. by an increase in register temperature of 77 degrees. The increase was 1.8 times. Hence, it appears that by using a mechanical fan in the air supply duct it was possible to increase the capacity of the furnace under test from two to three times that possible with gravity circulation.

In another test, by using an electric blower type of circulator with concentric rings, as shown in Fig. 1, with a piped furnace, the volume of warm air delivered was increased 45 per cent on the first floor, 11.4 per cent on the second floor and 10.8 per cent on the third floor. While the greatest increase in efficiency over natural circulation was found to occur at low temperatures, this is the aim of all well informed installers, as more even room temperatures at the different levels and longer life of the furnace plant is effected thereby.

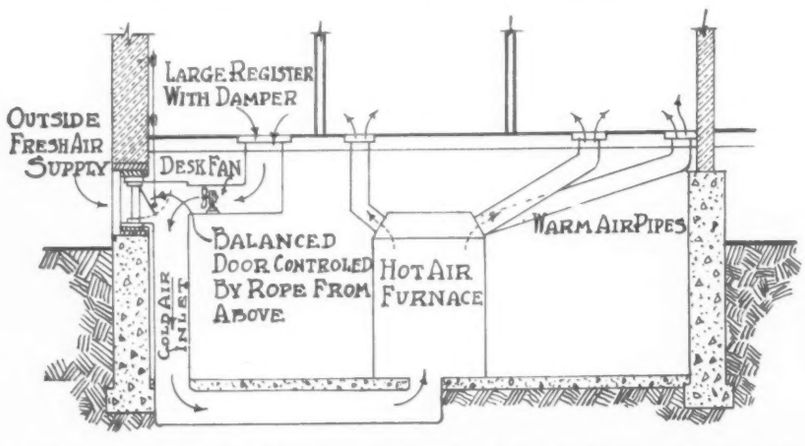


Fig. 2. How a Desk Fan May Be Installed in the Return Air Duct to Aid in the Circulation of Air.

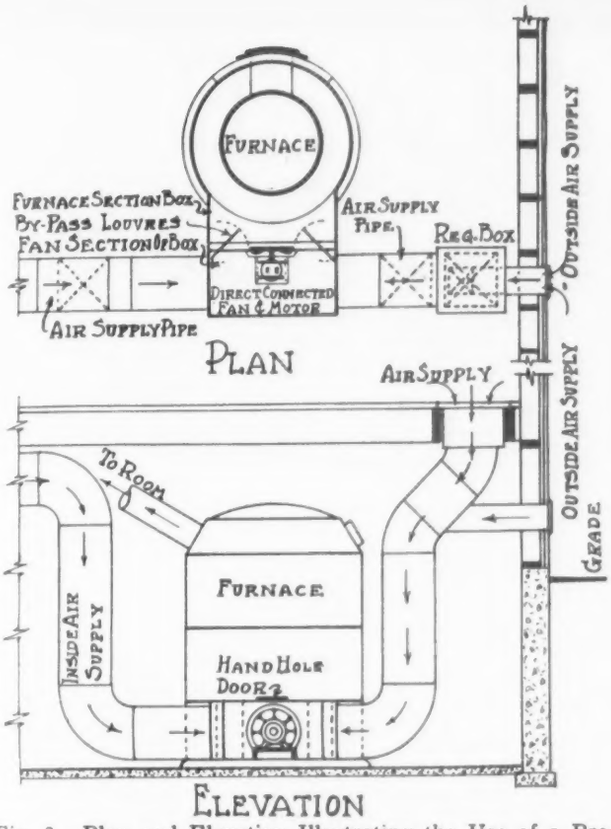


Fig. 3. Plan and Elevation Illustrating the Use of a Propeller Fan to Secure Forced Circulation.

The ideal temperature of register-air is 125 degrees Fahrenheit, yet 175 degrees is more common because of space limitations for piping. Every endeavor should be made to keep air temperature below 200 degrees. Low temperatures and large volumes of warm air are more easily provided when fans are installed.

What One Architect Accomplished

The important factors in favor of fans are their ability to make total recirculation positive and to insure delivery of heat to rooms with excessive exposure. Cases where both have been accomplished with the aid of fans are numerous and the author recalls one instance where results were particularly gratifying. An internationally known architect, Ernest Flagg, who owns the five-story building in New York in which are his offices, formerly heated the structure with two 24-inch (grate diameter) furnaces, the air for which came from outdoors. Wishing to experiment with forced circulation he had the casing of one of the furnaces enlarged and installed a 24-inch electric propeller fan in the casing, with direct connection to the supply duct which was changed to use inside air. The return air grille took its supply from the first floor hall. The cold air duct was converted into a warm-air leader and used to heat the rear of the building. This done it was found possible to heat the entire building with a single furnace. The surplus heater was removed as unnecessary. Mr. Flagg specified forced circulation furnace heating for the cellarless houses which are his hobby and about which he has written a large book, "Small Houses."

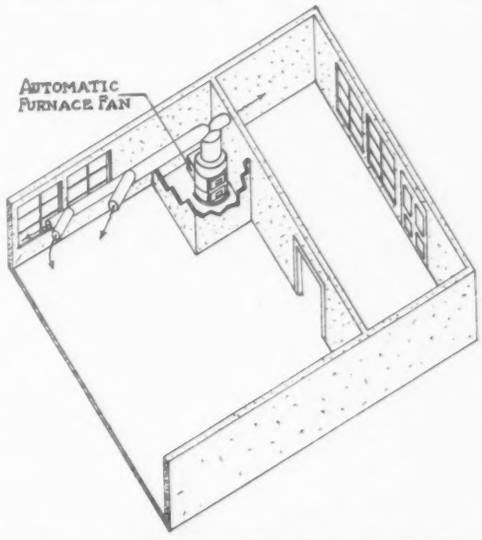


Fig. 4. How a Fan Furnace System Would Be Installed for the Heating of a Garage.

Although results as satisfactory as that obtained in the Flagg building are not always possible, forced circulation warm air heating is a method likely to come into vogue more and more in view of its greater heating capacity, which is usually accomplished without additional fuel.

The type of fan in most common use is of the propeller design, similar to the ordinary desk fan, but one manufacturer has sold successfully for a number of years a blower fan with a series of concentric rings like that shown in Fig. 1. Should it not be desired to operate the fan the open area between rings offers no impediment to the air supply by gravity. A common method of installing the apparatus is shown in the illustration. Here the supply is taken from a register in the first floor hall, the air being recirculated.

A practical arrangement, when the supply is partly from outside and partly recirculated, is shown in Fig. 2. Here the outside air supply duct is provided with a hand operated damper which may be operated from the floor above. The fan is placed inside the return air duct. With this method of installation it would be well to make the duct of about 22-gauge sheet iron and suspend the section by means of steel straps from the joists above.

An alternate method might be to pass the straps beneath the fan itself. The use of a pit between vertical pipe and furnace casing provides more free area, but is less desirable than a similar pipe above the floor because of the additional duty imposed in raising the supply to the bottom of the casing.

A Better Fan Arrangement

A better arrangement is that shown in Fig. 3 wherein the fan rests on a base in the cold-air box on the floor at a point near the furnace. It will be noted that there are two return air ducts and an outside air duct connected to one. The outside air supply duct need be only about one-half of the area of the inside air duct to which it is attached.

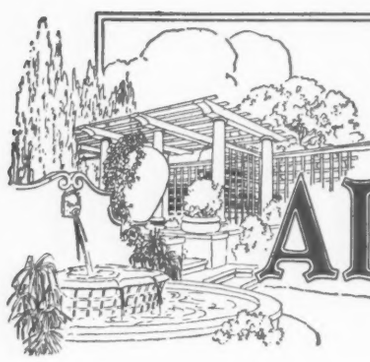
The fan shown in Fig. 3 is known as the automatic because of the dampers at either side of the fan blades. These are so balanced that they close automatically when the fan is in operation and open when the fan is not used. There is, thus, no obstruction to air flow and the supply duct functions just as if there were no fan when the mechanical feature is not desired.

This is a valuable point because it is often unnecessary to run the fan during the day, after the building has been once warmed. It is common practice, nevertheless, to run the fan for an hour or more in the morning to bring the room temperature to 70 degrees. Although electric current will rarely exceed 10 cents per day, if the fan is operated only for a short period each morning the current cost becomes nominal.

Industrial Heating

A wide application for forced, warm air heating not realized to a great extent at present is in heating industrial buildings. Until the fan furnace came into the popularity now enjoyed it was not customary to install furnaces in industrial buildings on account of inability to secure positive circulation. This was especially true when rooms to be heated were on the same floor as the plant, for without a fan it requires height to give the warm air motive head sufficient to reach the points desired in industrial buildings.

(*Continued to page 129*)



LANDSCAPE ARCHITECTURE

By F.A.Cushing Smith Landscape Architect

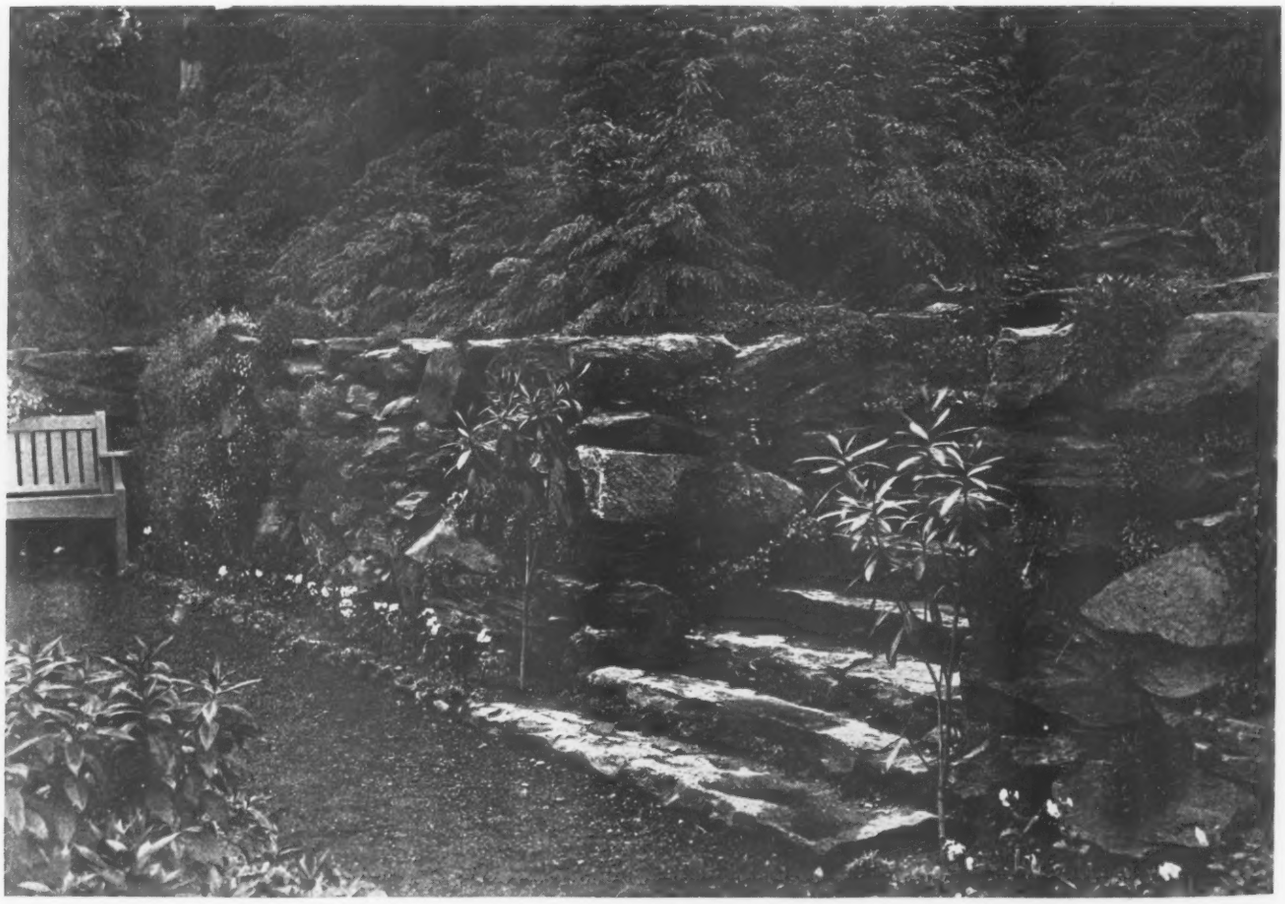
The Small Rock Garden

SOME of my readers may have visited Switzerland, or some of our western National Parks, where in the shadow of the snow-capped peaks upon the rocky hillsides, and in the fertile damp valleys nestle great masses of Alpine plants. For these it is needless to enthuse further over the delights which can be derived from even a small rock garden.

It has been only in recent years that the true rockery has been found on any but the larger estates or in our public parks. Today a rockery has become one of the adjuncts of even the small place, and all garden lovers, if they but spend the time, can produce miracles of color, clinging mosses and lichens hand in hand with ferns and rock cress and our other alpine friends which spread a protective mantle over the rugged jutting rocks.

Contrary to popular belief, and much general practice, a rock garden should preferably not be built up in the shade of a large tree, such as the elm. This location with the carefully prepared pockets of rich soil would give nourishment to the elm, and permit the larger tree to deplete the soil of water. This tends to bake or to dry out the soil which for most alpines must be continually moist.

For best results plan the location away from the house and in the open, giving all of the plants enough sunlight. Even the evergreens, against whose background the brilliant colored flowers seem to be enhanced, take much of the moisture, and rob the soil of food. Such shade and shelter as is essential in the growth of certain plants can be best secured by the arrangement and design of the rocks making up the rockery.



The Rockery Has Now Become One of the Most Charming Adjuncts of Even the Smaller Gardens and One Well Worth All the Effort Employed in Making It a True Reproduction of the Natural Rock Ledge.

In the building up of the rockery take care that the garden has more than a mere pile of stones covered with earth as its heart. Each stone must be selected with care, fitted together to carry out the preconceived design. That is the reason why a plan is difficult to prepare, and why the amateur makes so many mistakes. Nature has many examples of ideal rock arrangement for a rockery. How few of us ever notice these formations or make a sketch of some grouping or detail which we admire.

In filling the earth around each stone, be sure that there are no spaces unfilled. Air spaces prevent moisture coming up from below. In this section of the country where stone is not one of the native building materials, as it is in the vicinity of Philadelphia, stone of the weathered softened colors, with rounded edges, and no artificial stratification is the most choice material. Limestone well selected can be secured from southern Wisconsin quarries where the old and odd pieces, exposed for long years to the action of the elements, are much sought after.

In Laying Up the Rockery Care Must Be Taken to See that All Spaces Are Well Filled with Rich Earth as Air Pockets Shut Off the Moisture from Below Which Is so Necessary to the Plants.

In laying up the rocks, whether the rockery be a retaining wall, or a part of a pre-studied, informal garden, the stones must be sloped toward the back or inside of the wall, so as to insure the saving and collection of all of the treasured rainfall for the rootlets of the alpines.

As to design, that is much a matter of personal taste, but it has always seemed to the writer that no happy result can be achieved by having the rockery rise from an otherwise level lawn in a mound or pile, and expect it will look natural.

The soil in which alpines seem to prefer to grow is a light, loamy, even gritty soil, with a top covering of rich woods dirt with much leaf mold to hold the moisture. Clay soil, if present, will have to be removed entirely, and if the sub-soil is a stiff clay the area may require drainage.

The student of geology readily understands the tendency of an exposed rock quarry wall or other ledge to gradually deteriorate as the wind, rain and frost yearly carve its face. The base of the large rocks is never seen, nor do we ever find a stone wall effect. The fissures are usually wider apart at the base, with apparently smaller stones or narrower fissures near the top of the ledge. Such a formation lends stability to the resultant rockery.

Because plants in the rock garden require even more care than those in the open border, their selection should be painstakingly made, and only those adapted to the purpose of rockeries should find their place there. Sweet William and even common phlox and iris are sometimes used, but these belong in an entirely different habitat.

Among the evergreens which we might choose are the common Juniper, the wintergreen, dwarf mountain pine, and the yew in several varieties. Due to the congested and somewhat crowded conditions in the average rockery the perennials selected must be those which tend to overcome such obstacles. They should be hardy, requiring little protection, and adapted to the climatic conditions of the locality.

Among our friends among the plants in this class are the following: alyssum saxatile or golden tuft, columbine, dwarf rock cress, cerastium or snow in summer, Scotch pink, moss pink or phlox subulata, sedum in variety, thyme and tunica, creeping speedwell and many of our well-remembered wild-flowers and ferns.

Forced-Air Heating

(*Continued from page 127*)

With the mechanical fan attached to the air supply duct, however, it is possible to install the warm-air furnace successfully in most all structures except those partitioned off into small areas, as, for example, office buildings. Fig. 4 demonstrates how the forced furnace may be installed in a garage. One branch distributing duct delivers warm air to the office while another extends to the main part of the garage, in the opposite direction. Three delivery nozzles provide excellent distribution of heat.

In this class of building recirculation of air is rarely attempted because of the impurity of garage air. The outside air heats and ventilates simultaneously, then escapes to the outside through cracks about windows and doors.

In estimating the size of fan to use in a total recirculation system it is well known that four changes of air per hour, when the temperature of the warm air delivered is 140 degrees, provides sufficient heat to overcome the loss due to exposed wall, glass and infiltration. Hence, if the total contents of the building, in cubic feet, is multiplied by four the result is the volume of air necessary to be handled by the fan per hour. Were this amount divided by 60 the volume required per minute is known. As delivery temperatures will usually be from 175 to 200 degrees, this method of estimating may be regarded as conservative.

✣

Hollow-Tile

(*Continued from page 124*)

over a form. The tile reduces the weight sufficiently to allow a relative heavy floor load with parallel reinforcing. The upper slab may be put down with sleepers in it, or spot grounds can be used.

In Fig. 3 the crossed tee-beams are quite apparent. The strain on the floor through the load and its own weight tends to sagging. This sagging strain produces tension along the lower side of the beam which is easily resisted by the net of rods. Such resistance then throws an opposing strain on the upper section of the floor which, being of solid concrete, is strong enough to stand its share. The advantage of a full tile ceiling on the lower side is often worth the trouble of a slab floor.

Along with this I should have run an exhibition of expansion bolts and screws. They are especially useful in connection with hollow tile building for use in fastenings.

Homes in COLORS

Make Your New Homes Modern and Complete

By WILLIAM A. RADFORD
President and Editor-in-Chief of the American Builder

WHEN you are planning and building your homes it pays to build well and put in modern comforts and conveniences.

In the old days they used to build big houses but without much thought for ease in heating or ease in doing the housework. Today houses are being built smaller and better.

More thought is given today to the design of the house. Good looks—architecture—has a real cash value, especially in the home of small to medium size. The well planned home always looks best and is easiest to sell.

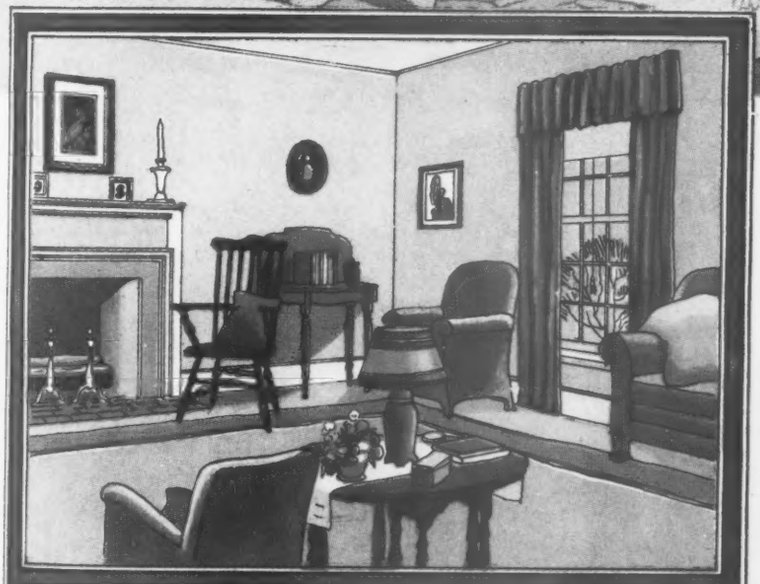
But quite apart from the looks of the new home is its equipment—its heating plant, plumbing, lighting fixtures and various special items that make the modern home so attractive. When you are helping others to plan their homes tell them to get all the fun and satisfaction out of it they can. Advise them to plan for all of the good and interesting items that are on the market today to make the home more modern and efficient. Look into them all, get the facts. You may want to include them or you may conclude otherwise, but at any rate, get all the information and then decide. The time to make up your mind on all details of your new homes is while they are being planned. Changes will be costly later, but now you can make them to your heart's content and at no expense.

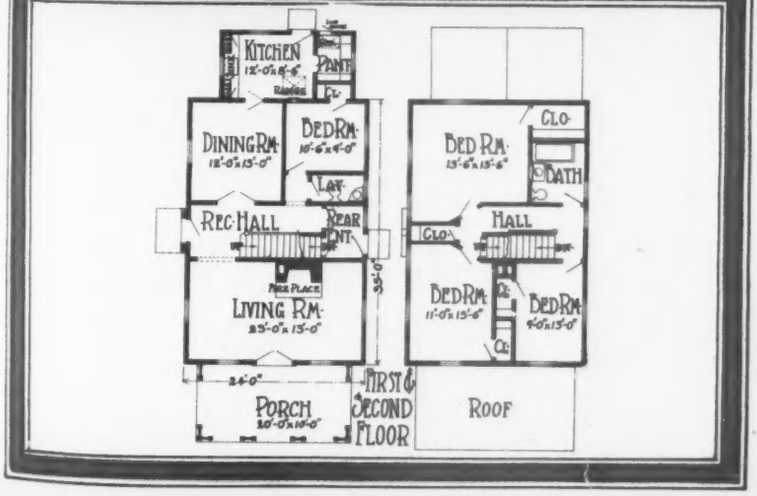
Home planning ideas seem to travel in cycles. For a time the big house, formal and stately, was the correct thing; but right now the wheel has turned to the other extreme and it is the quaint, small house full of clever little touches which brings out the exclamations of delight and approval.

A very successful real estate builder operating in a nearby city recently advertised a demonstration of "Six Small Homes of Quaint, Medieval Architecture," and thousands flocked to see them—showing the strong appeal which the quaint and artistic in home planning has right now with the home seeking and home building public.

It has been our aim in selecting the home designs in colors presented in this department to secure the most popular and the best selling homes among those possessing genuine architectural merit and more specially those with a dash of this present-day popular quaintness.

Complete working drawings are available from which any of these modern homes as illustrated can be built or if changes are desired consult with your local architect, lumber dealer or other building advisor or come to us for special plan service.





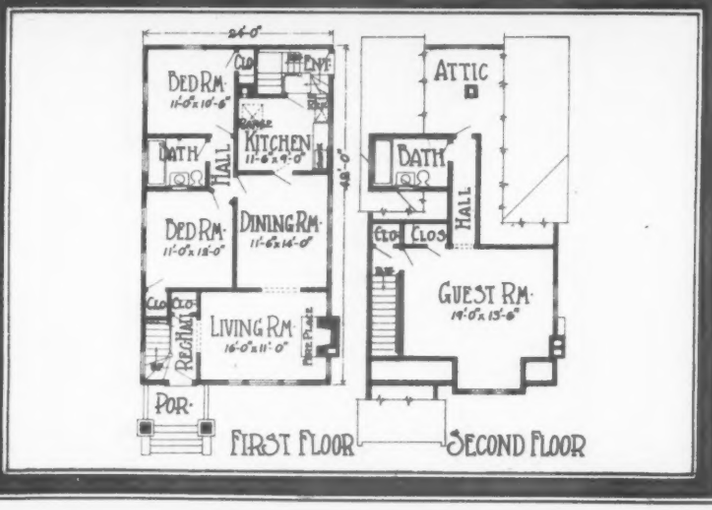
The WASHINGTON

THIS seven room Colonial home includes a first floor bed room and lavatory. The color sketch shows a corner of the living room.

Detail of Colonial Entrance

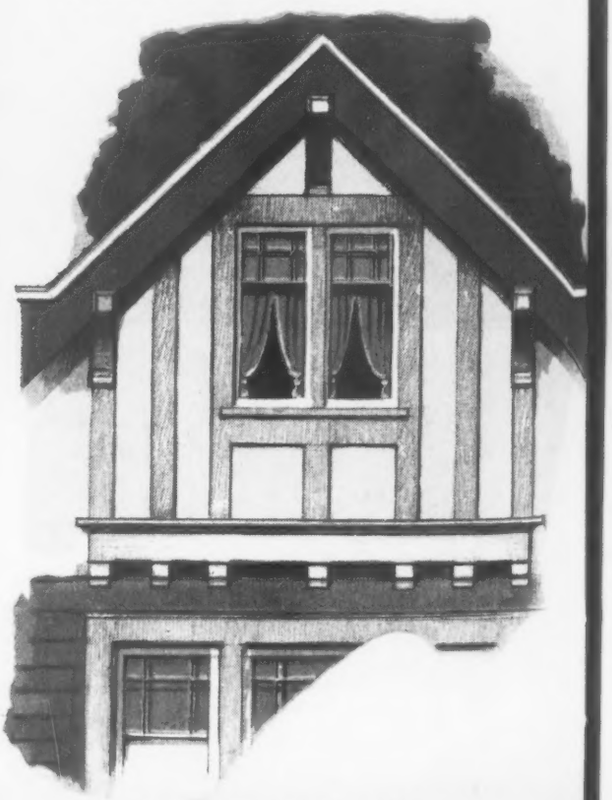
Pat. March 15, 1921 and Sept. 30, 1924.
Copyright 1926, Wm. A. Radford, Chicago.

COLORPLATE W-II



The WADSWORTH

A COZY cottage with a large guest room and extra bath on the upper floor. A bed room is seen in the color sketch.



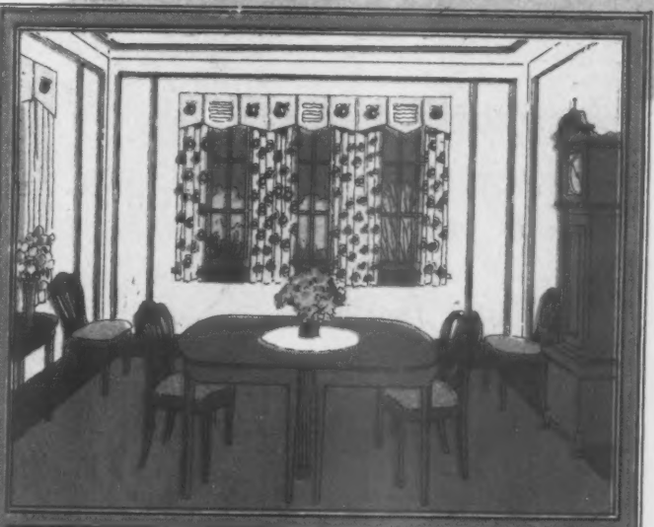
Detail of Elizabethan Gable

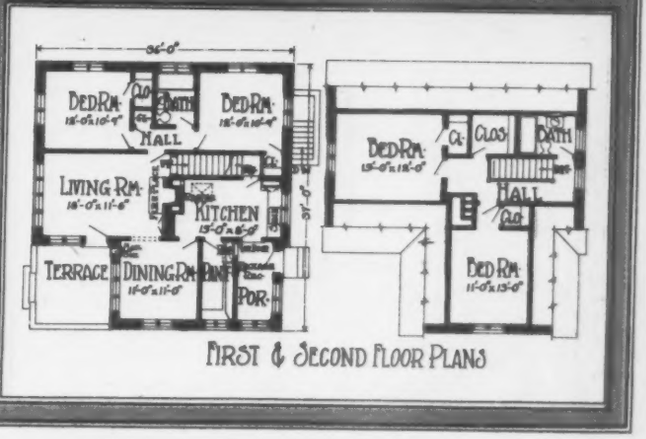
120 : 31/4 =

The WAUKEGAN

SOLID permanence is seen in every line of this attractive brick house. In the color sketch a glimpse of the dining room.

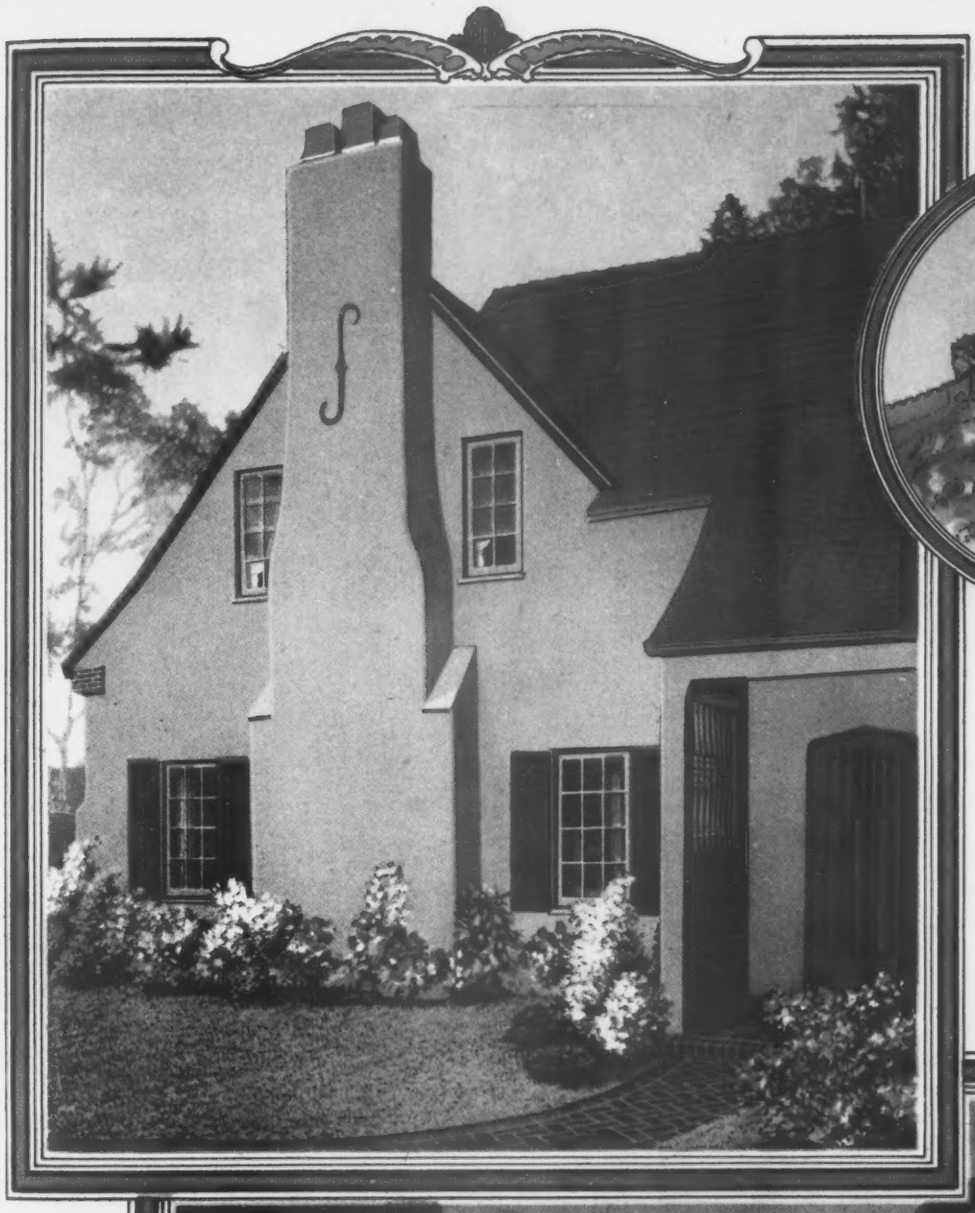
Detail of Entrance



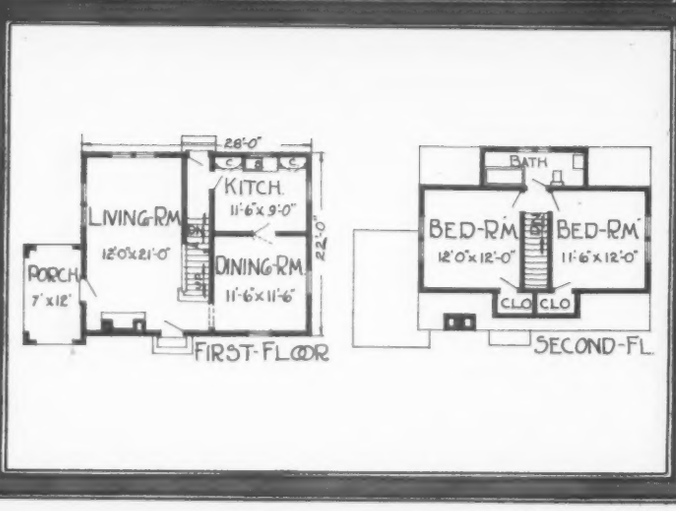


FIRST & SECOND FLOOR PLANS

A TERRACE porch approached by brick steps, above, below a simple living room with casement windows. Home of G. E. McKelvey, Los Angeles, Calif.



A MAN'S home is his castle and the comparison is an apt one for the Los Angeles house of G. E. McKelvey, pictured at the left with its library room below. Arthur Kelly, architect.



The WILDWOOD

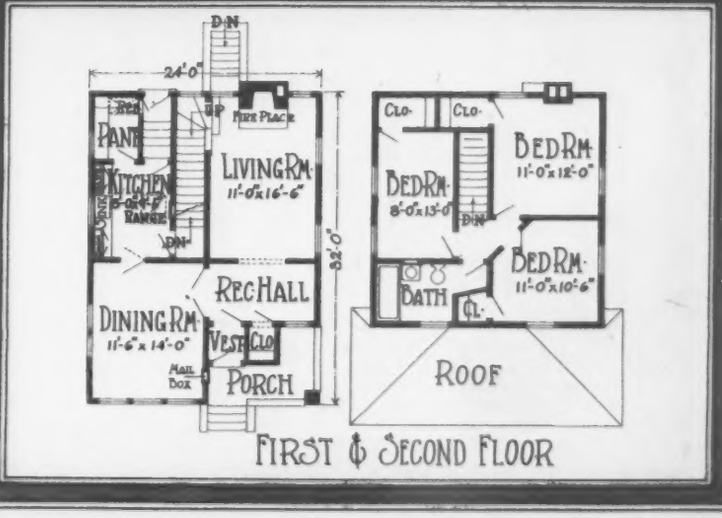
FIVE rooms within a 28 by 22 foot foundation are offered by this little cottage. The living room is shown in the color sketch.

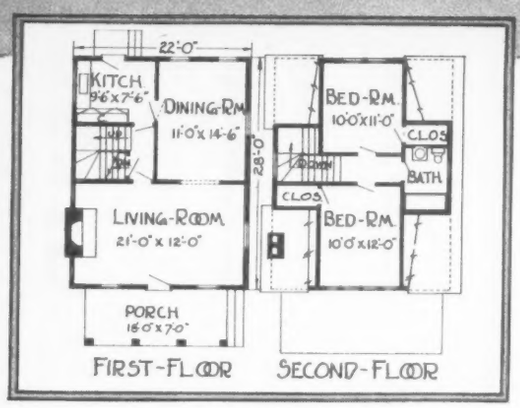
Detail of Entrance

The WAYSIDE

WIDE shingles are effective on this square style house with projecting dining room. In the color sketch, a view of a bed room.

Detail of Entrance



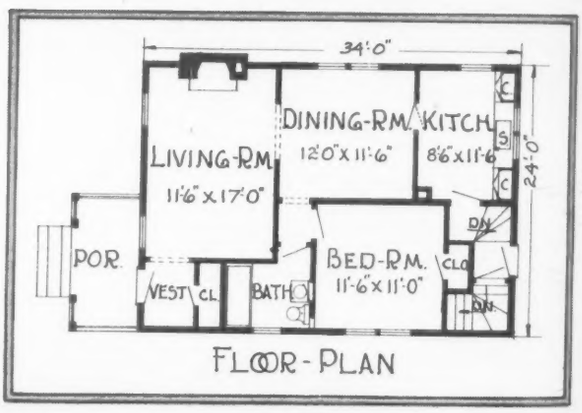


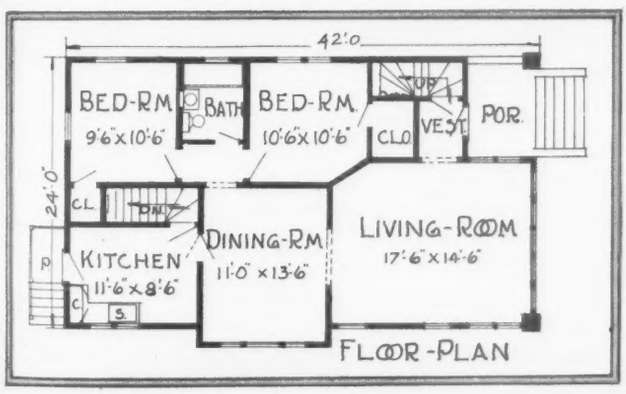
The WAKEFIELD

ABOVE are shown the exterior and plan of a small shingled cottage.

The WALDEN

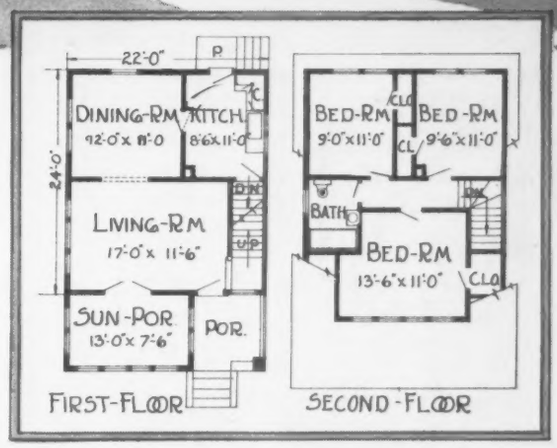
AT the right and below a four room bungalow 24 by 34 feet.





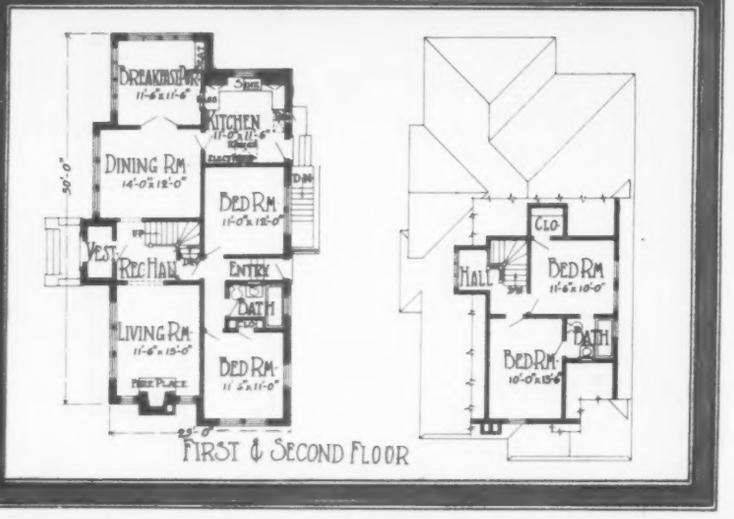
The WARD

A BUNGALOW of five rooms, shown at the left and below.



The WALTHAM

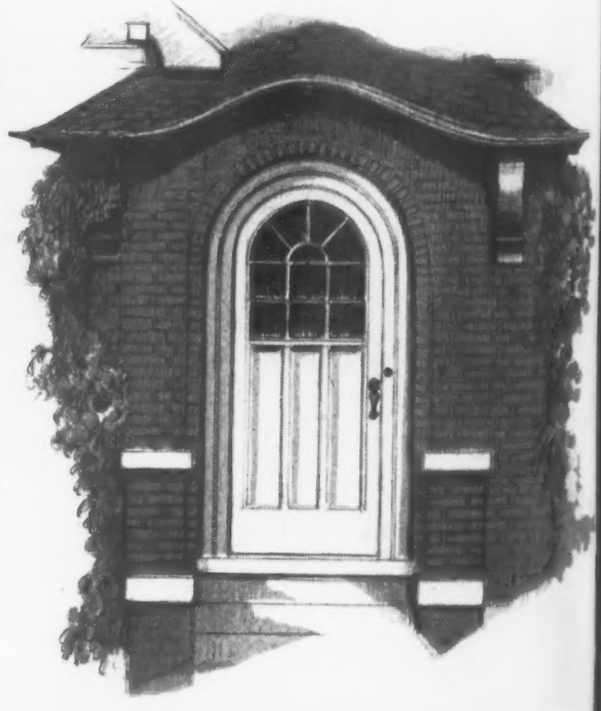
SIX rooms and a sun parlor are provided in the design above.

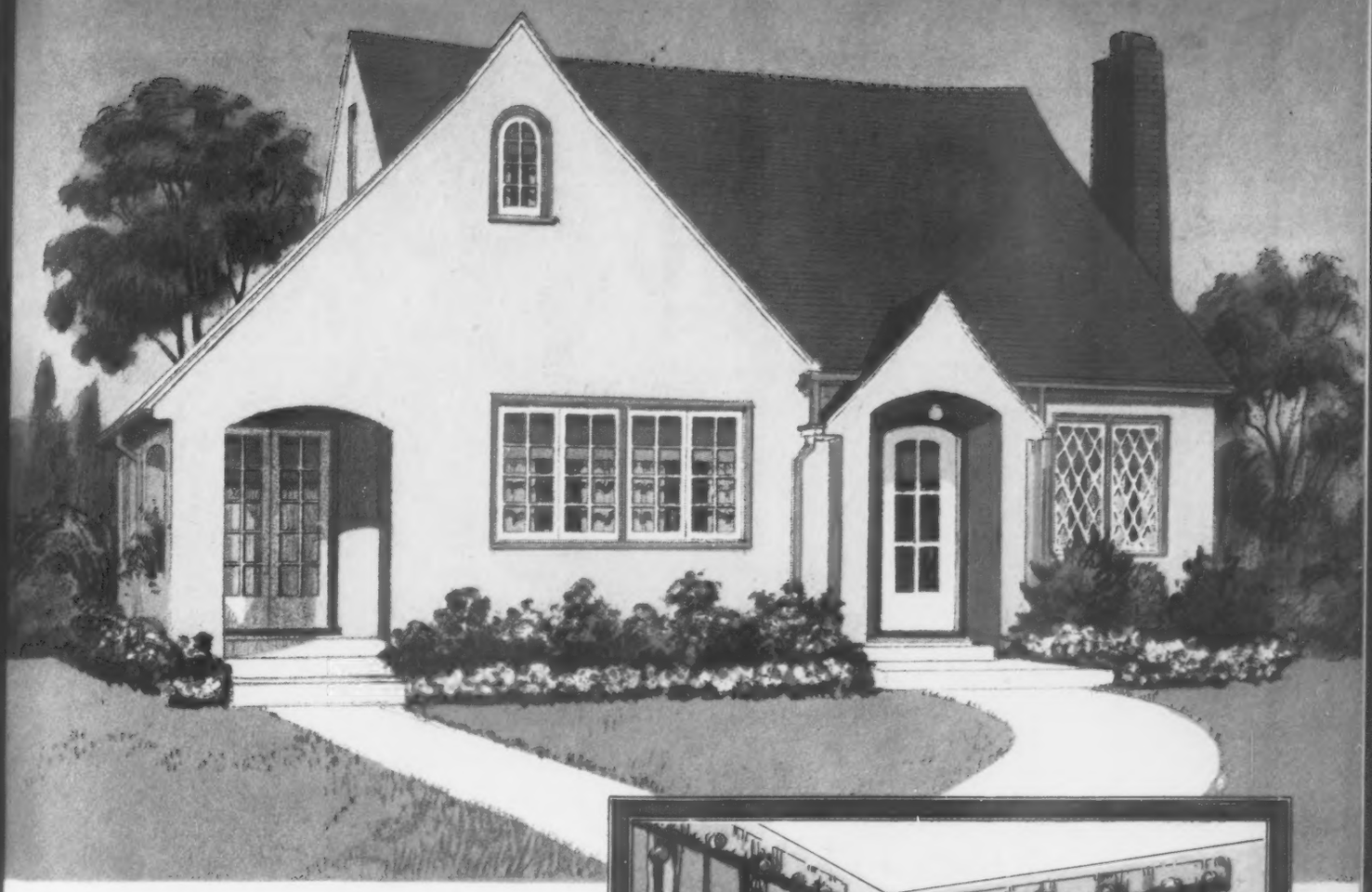


FIRST & SECOND FLOOR

The WHITNEY

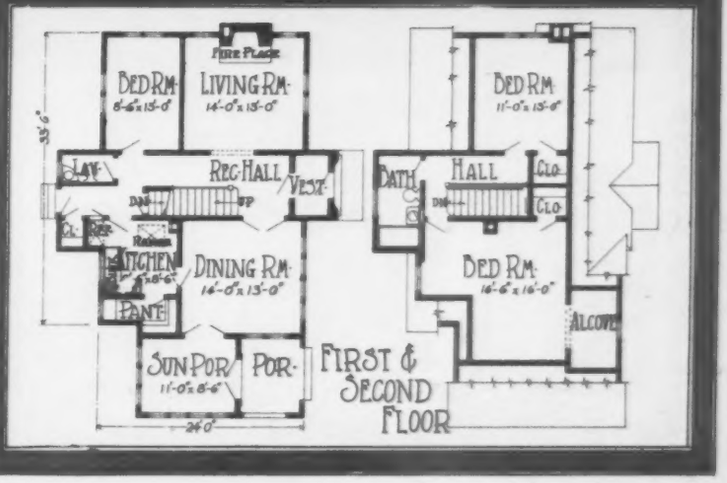
AN exceedingly comfortable and attractive home with seven rooms and breakfast porch the color sketch showing the interior of the latter.



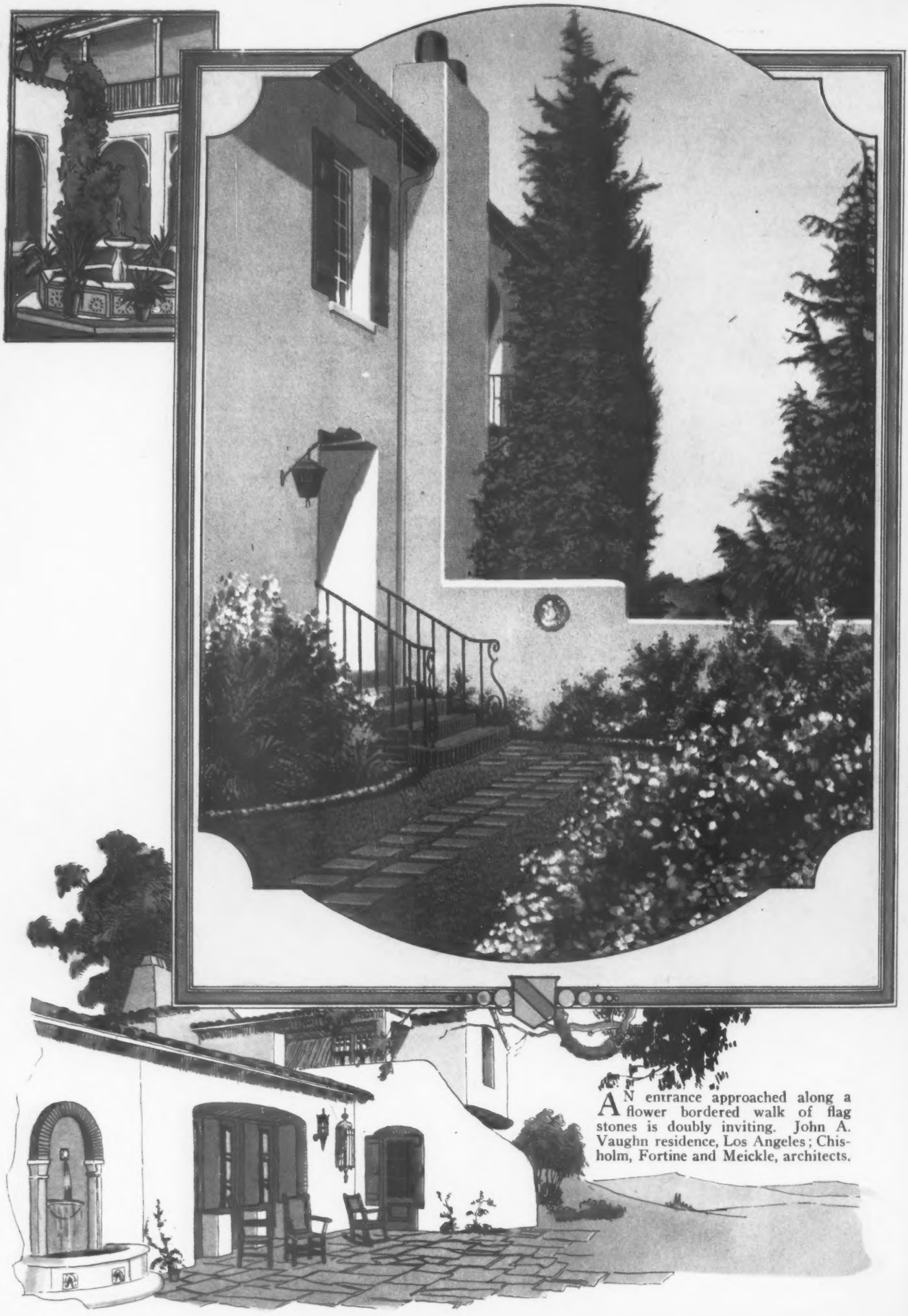


The WATERTOWN

A DISTINCTIVE home offering six rooms, an enclosed sun porch and first floor lavatory. In the color sketch we have a view of the sun porch.



Detail of Entrance

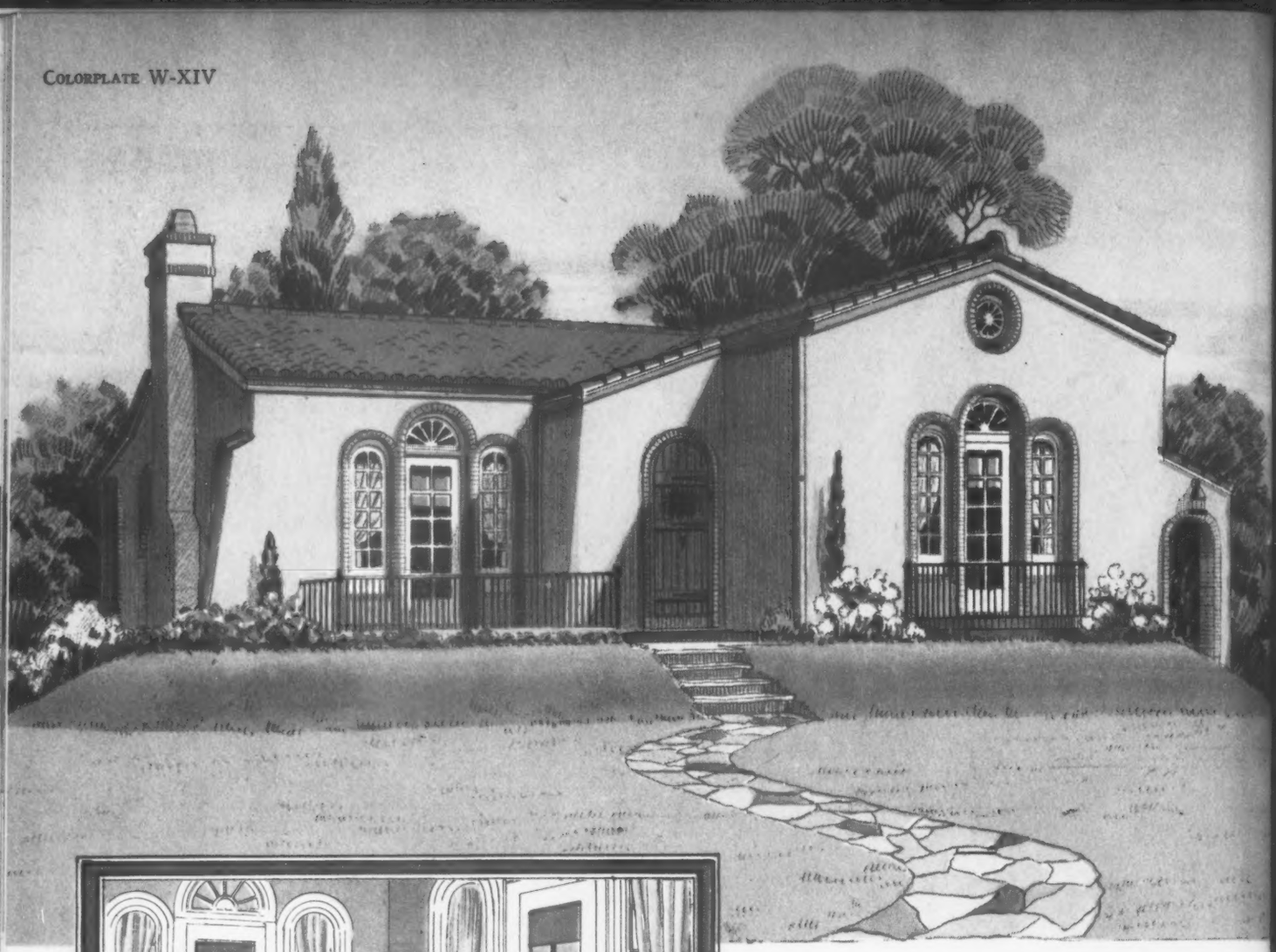


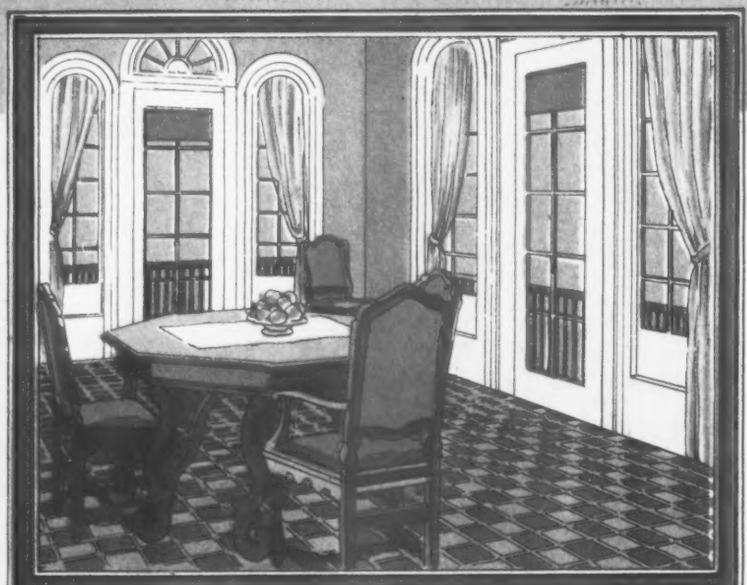
AN entrance approached along a flower bordered walk of flag stones is doubly inviting. John A. Vaughn residence, Los Angeles; Chisholm, Fortine and Meickle, architects.

Glimpse of the Patio Garden of Max Winter, Santa Monica, Calif.; Lloyd Rally, Architect.

A FOUNTAIN or pool adds charm to any garden whether it be of the formal or informal type.

COLORPLATE W-XIV

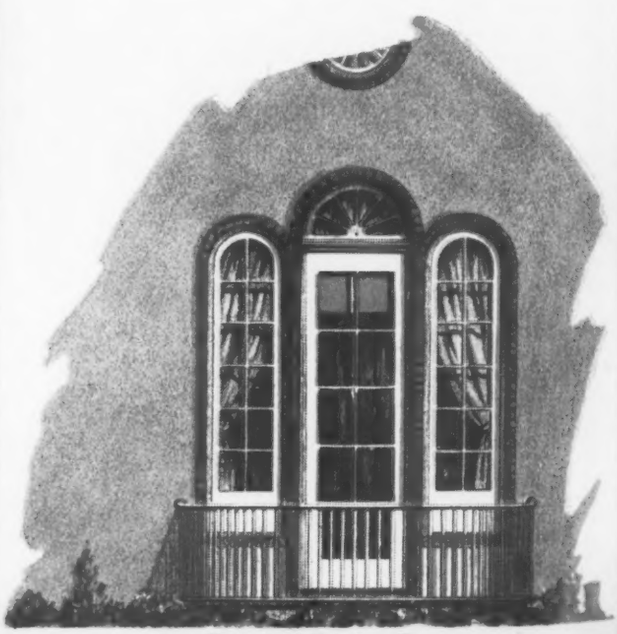




The WARWICK

A BEAUTIFUL Italian bungalow containing five rooms and bath. The living room has delightful open air terraces on two sides. The dining room has two balconies and each of the bedrooms has its balcony—quite an open air design. The arrangement of the rooms in this house with dining room to the front, living room in the wing and bedrooms in the quiet seclusion of the rear is very happy.

Color sketch to left shows the dining room.

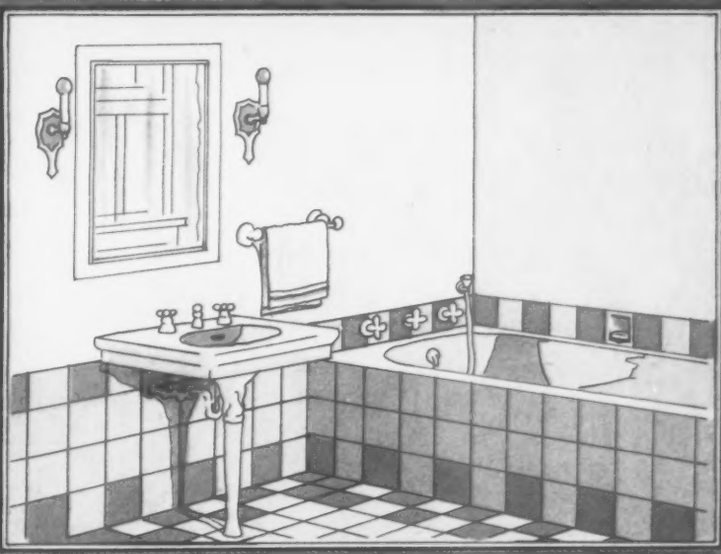


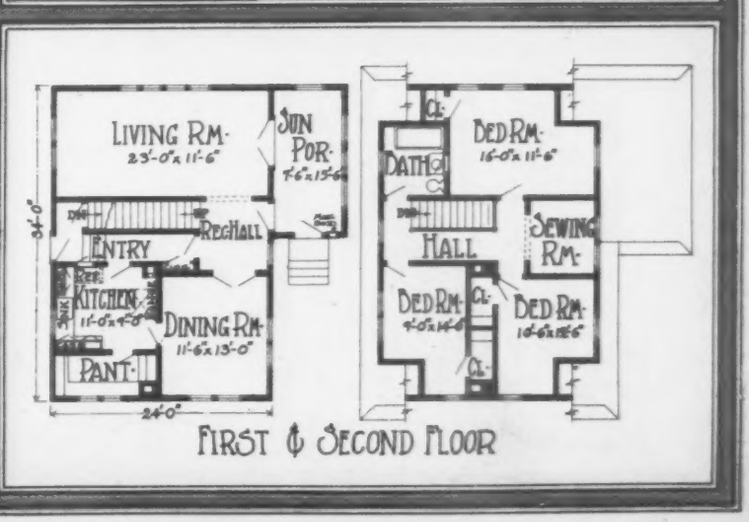
Detail of Dining Room
Triple Window with Balcony

The WABASH

A VERY practical home containing seven rooms and bath. The large entrance vestibule is glazed to serve as a sun porch. Color sketch to right shows tiled bathroom with built-in tub.

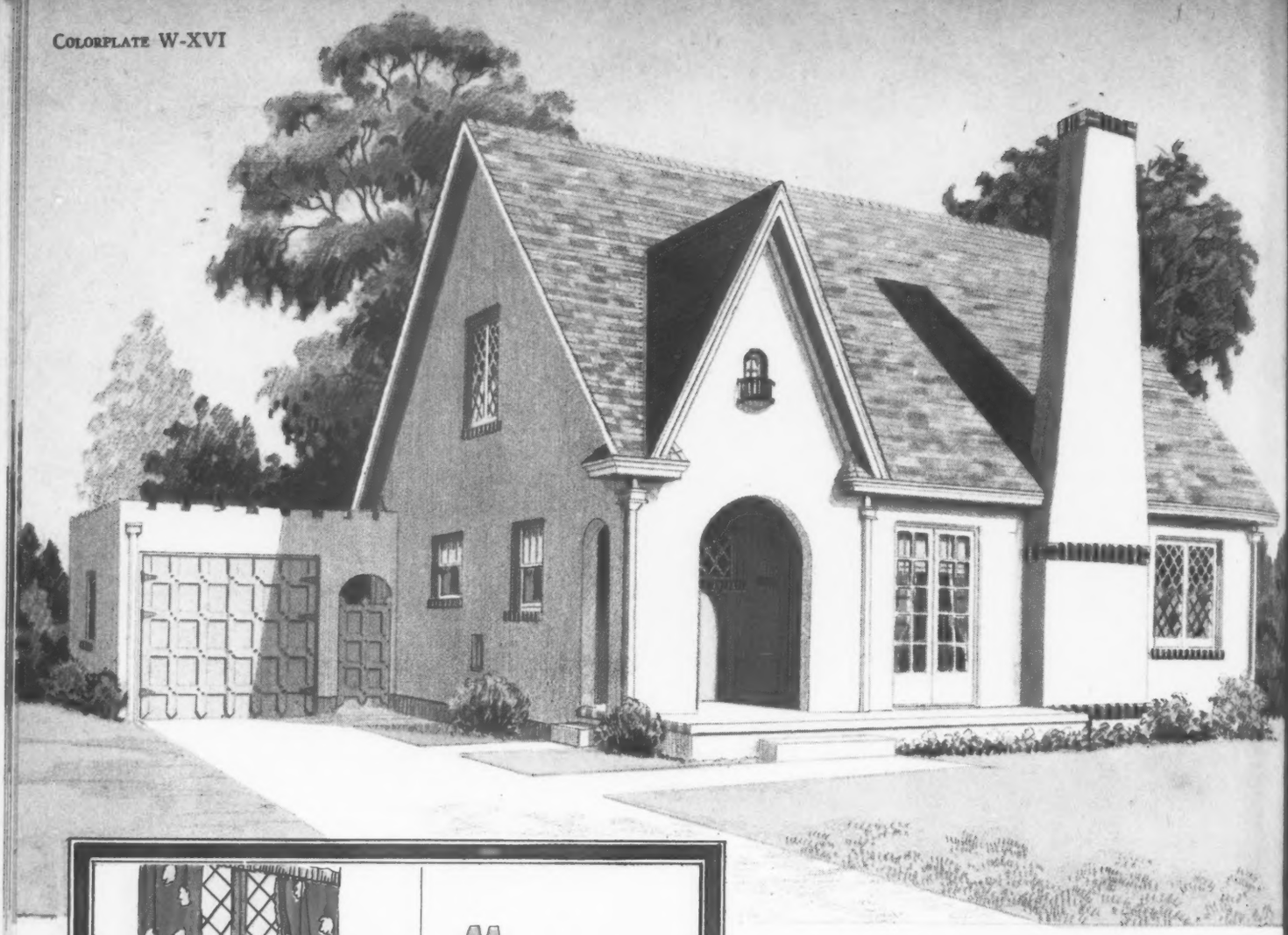
Detail of Entrance into Sun Porch

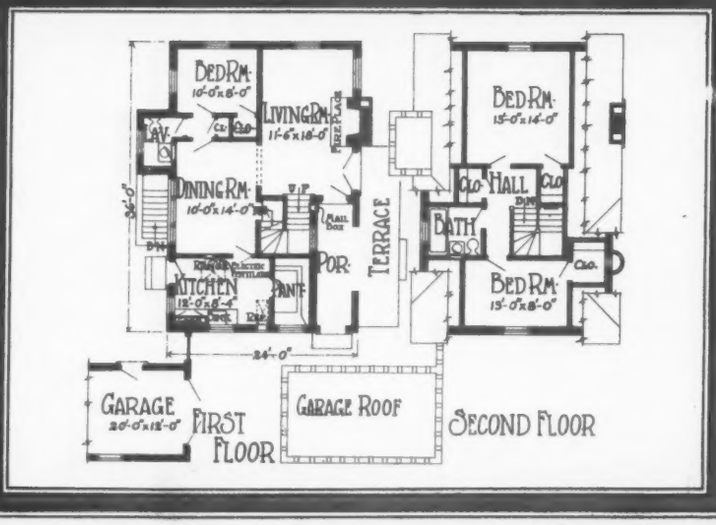




FIRST & SECOND FLOOR

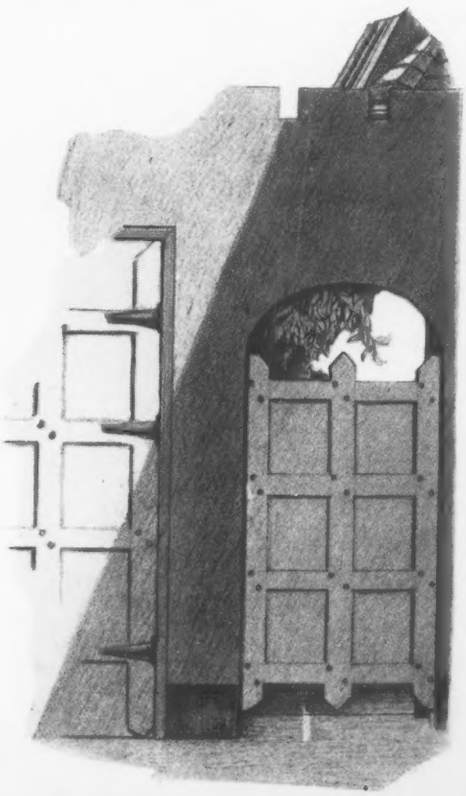
COLORPLATE W-XVI



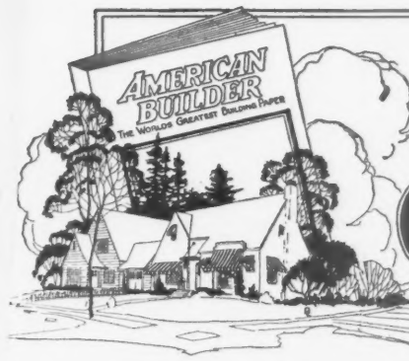


The WACO

THE first floor bed room is becoming exceedingly popular. Here we find it is a six room house with attached garage. The sketch gives glimpse of one bed room.



Detail of Service Gate



OUR FRONT COVER HOME

A Home to Be Proud Of and Affording Every Comfort Desired by the Home Loving American Family

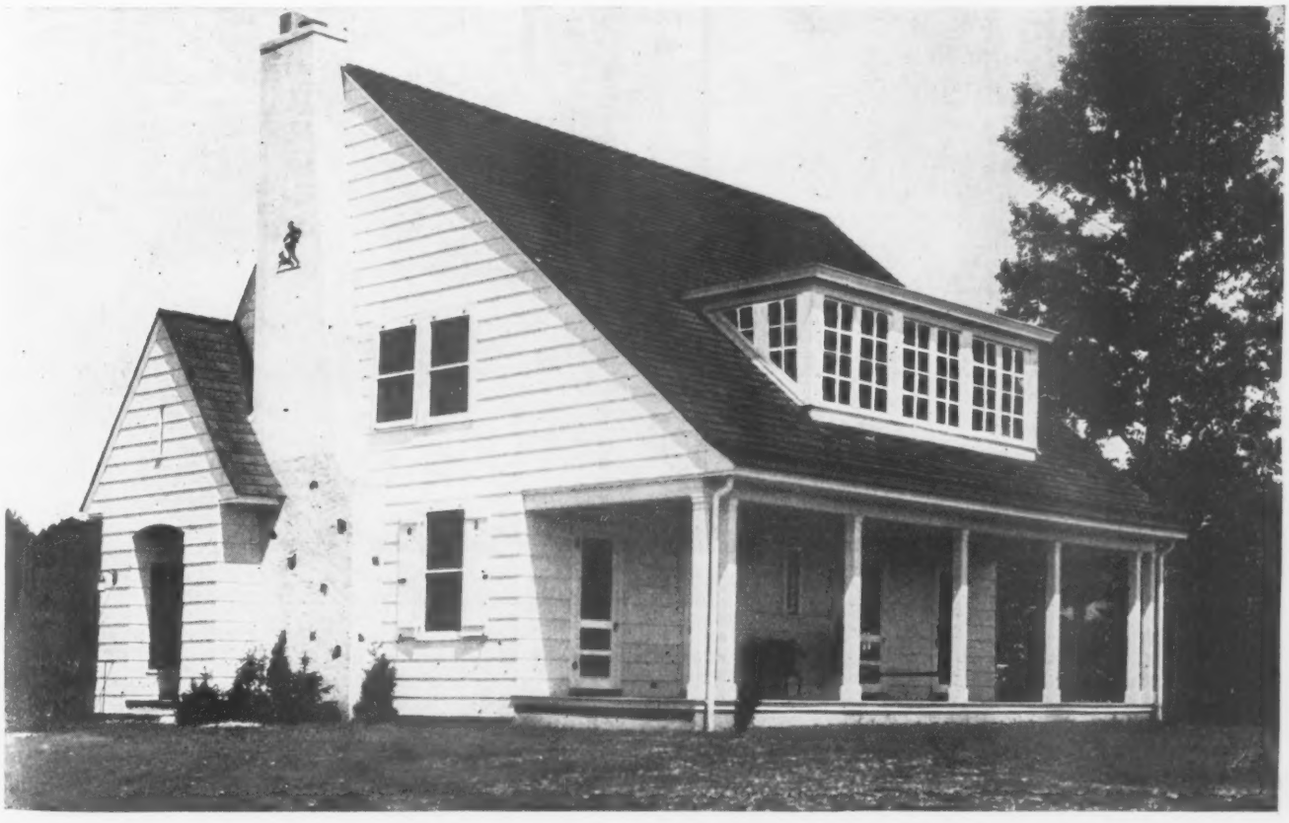
IF ever architects had a right to be proud of a home design, Lackey & Hettel, of Camden, New Jersey, may fairly claim the privilege of boasting of the design created for the building of Our Front Cover Home. Here is a house possessing all the elements which go to make an ideal home, not only as to charming appearance and a homelike atmosphere, but also in the arrangement of space and provision of features which afford a maximum of living comfort and convenience.

The plan offers almost everything that the average family could expect or desire and many things which would never occur to the prospective home builder if his attention was not particularly called to them. To mention just a few of these: there is a built-in mail box in which the mailman can deposit the mail, leaving it entirely safe from the weather and from petty thieves, and from which it may be removed from the inside, without going outside the door.

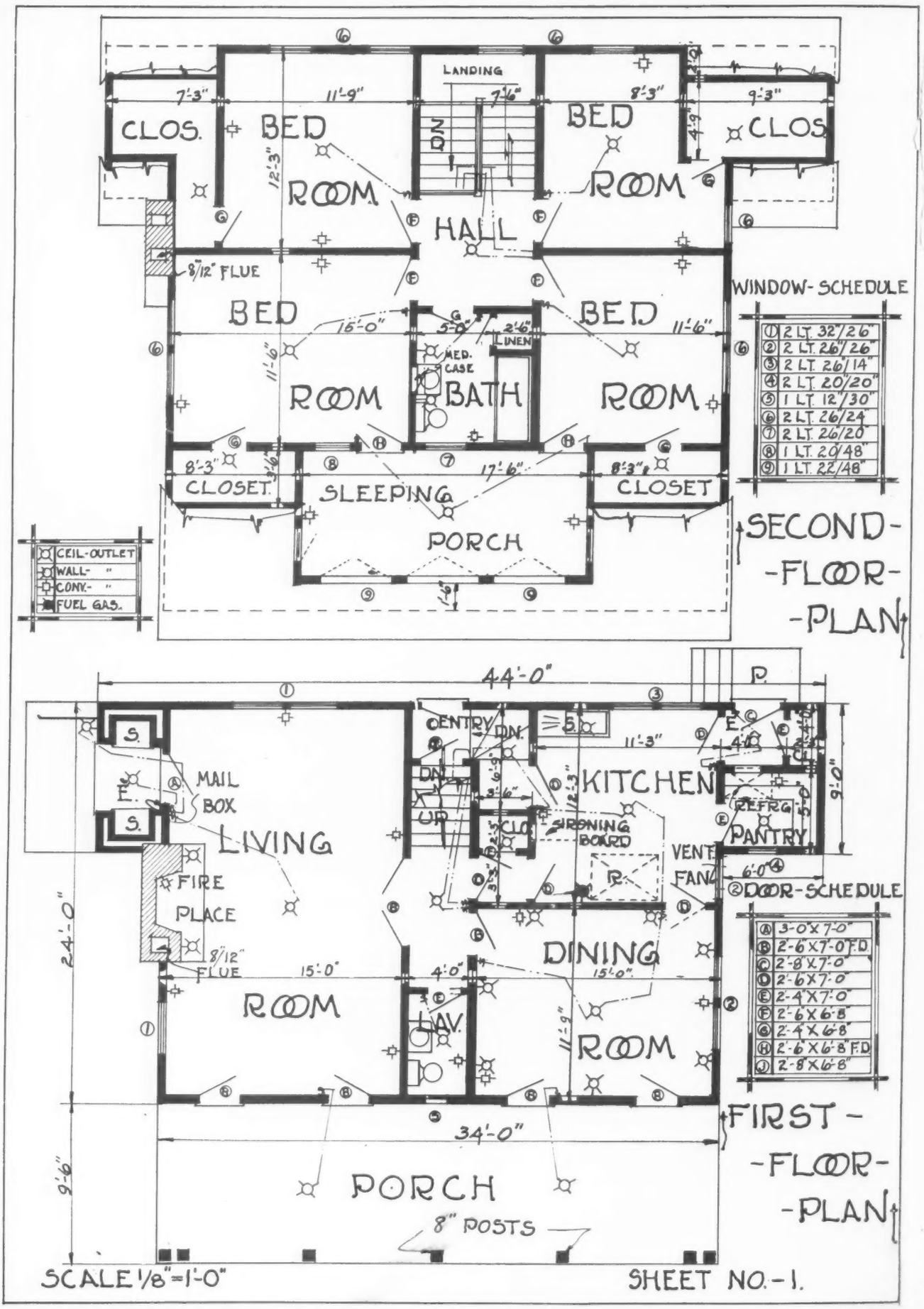
Then, too, there is a first-floor lavatory, an extra which is coming to be more and more appreciated and is easily worth the extra cost of its installation. In the kitchen we find a kitchen closet where the household tools may be kept always out of the way but always quickly available, a built-in ironing board and a separate refrigerator pantry, with provision for icing from a rear entry without entering the kitchen. A second entry makes it possible to reach the basement either from the kitchen or from the outside.

On the upper floor, with its four large bedrooms, there are four corresponding closets. These are large beyond the dreams of the most optimistic housekeeper. Also there is a commodious bathroom with a linen closet inside and finally a sleeping porch which may be reached from either of two of the bedrooms and which increases the sleeping facilities to a large degree.

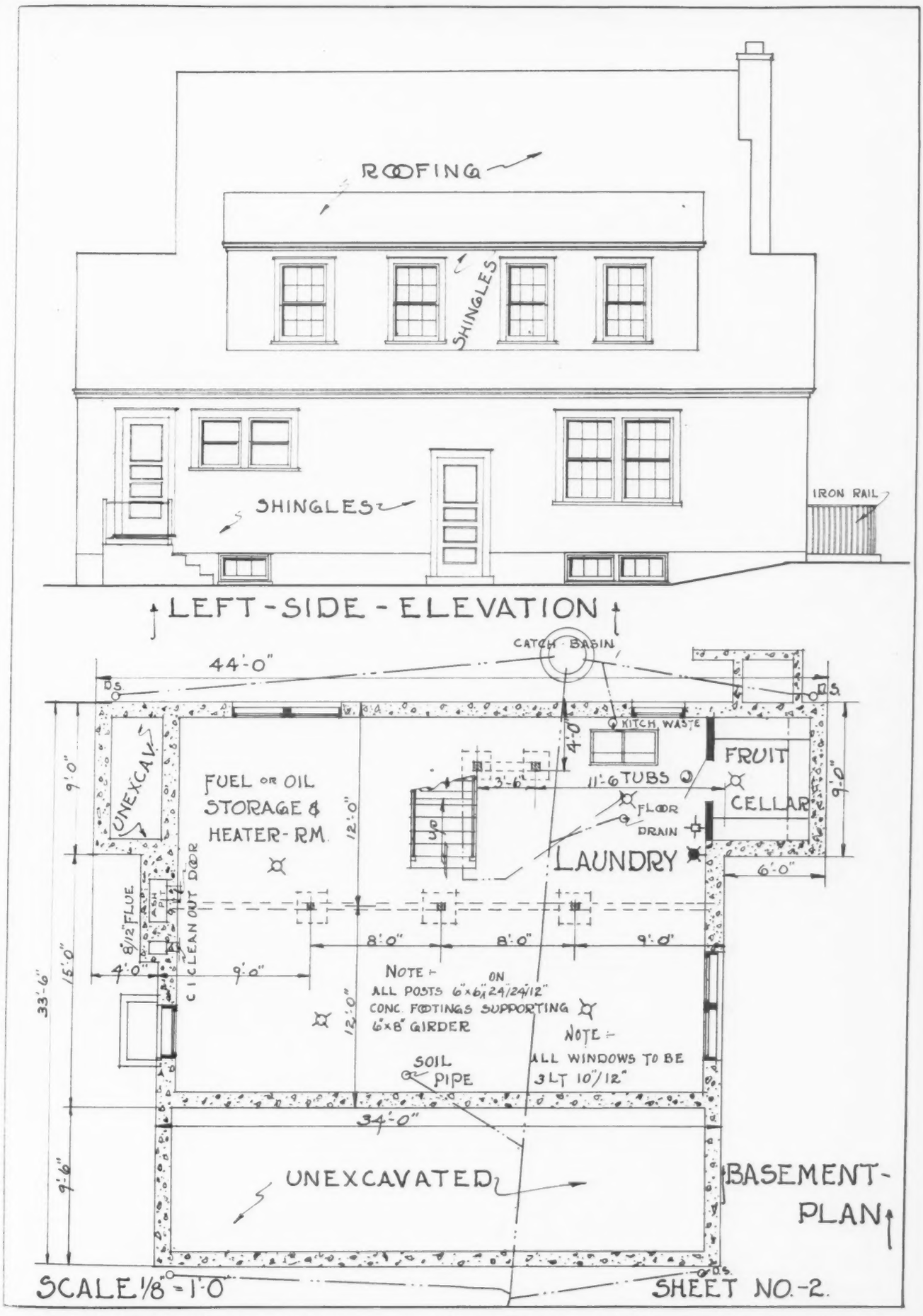
Wide siding and shingles have, very appropriately, been used for the finish of walls and roof. The side walls are in white, very effective against a background of green foliage, while the roof is stained a pleasing shade of green.



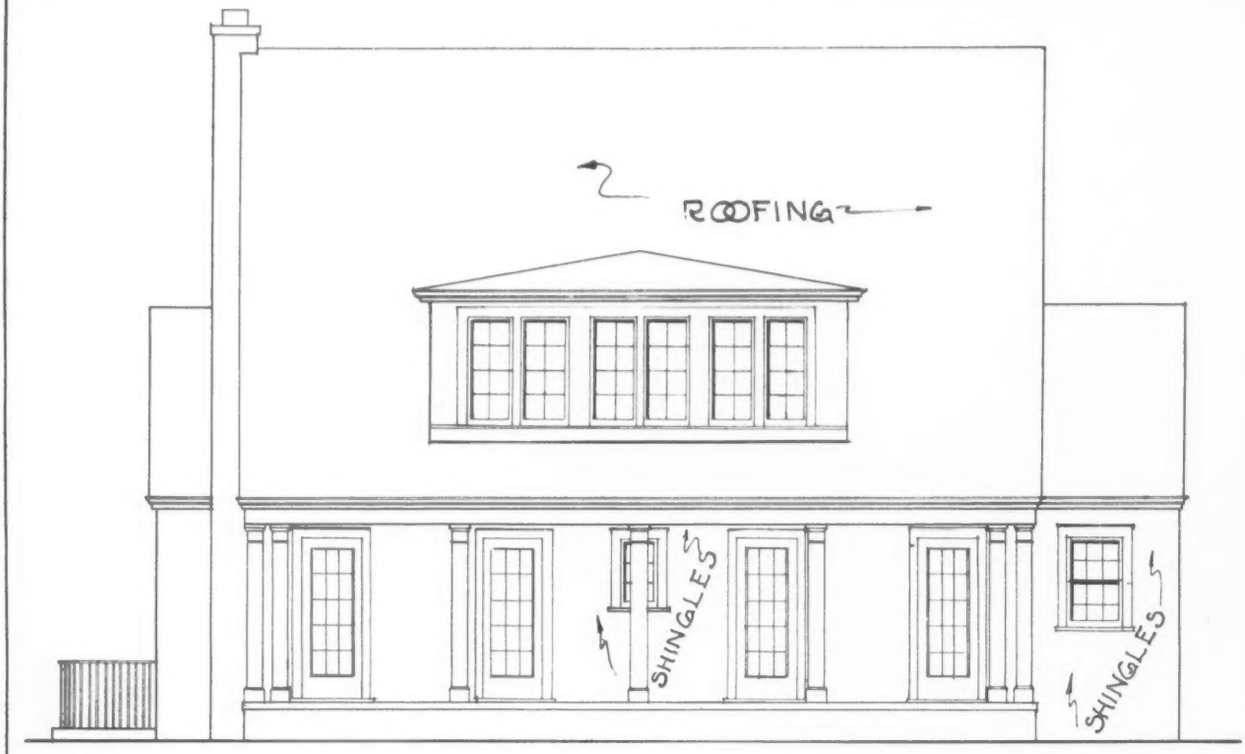
In This View of Our Front Cover Home, Many of Us Will See Our Ideal Home Materialized for It Represents a High Degree of Architectural Skill in Providing Those Features of Charm and Comfort Which Are Demanded by the Modern American Family. Complete plans are found on the following pages.



The Plans of Our Front Cover Home Bring Out the Attention Which Has Been Given to Providing Those Features Which Distinguish the House Built to Live in from That Built Merely to Sell.



The Left Side Elevation Shows the Arrangement of Service Entrances, of Which There Are Two, While Below Is a Basement Plan with Provision for Heating Plant and Fuel Storage, Laundry and Fruit Cellar. Other elevations and details are shown on the next two pages.



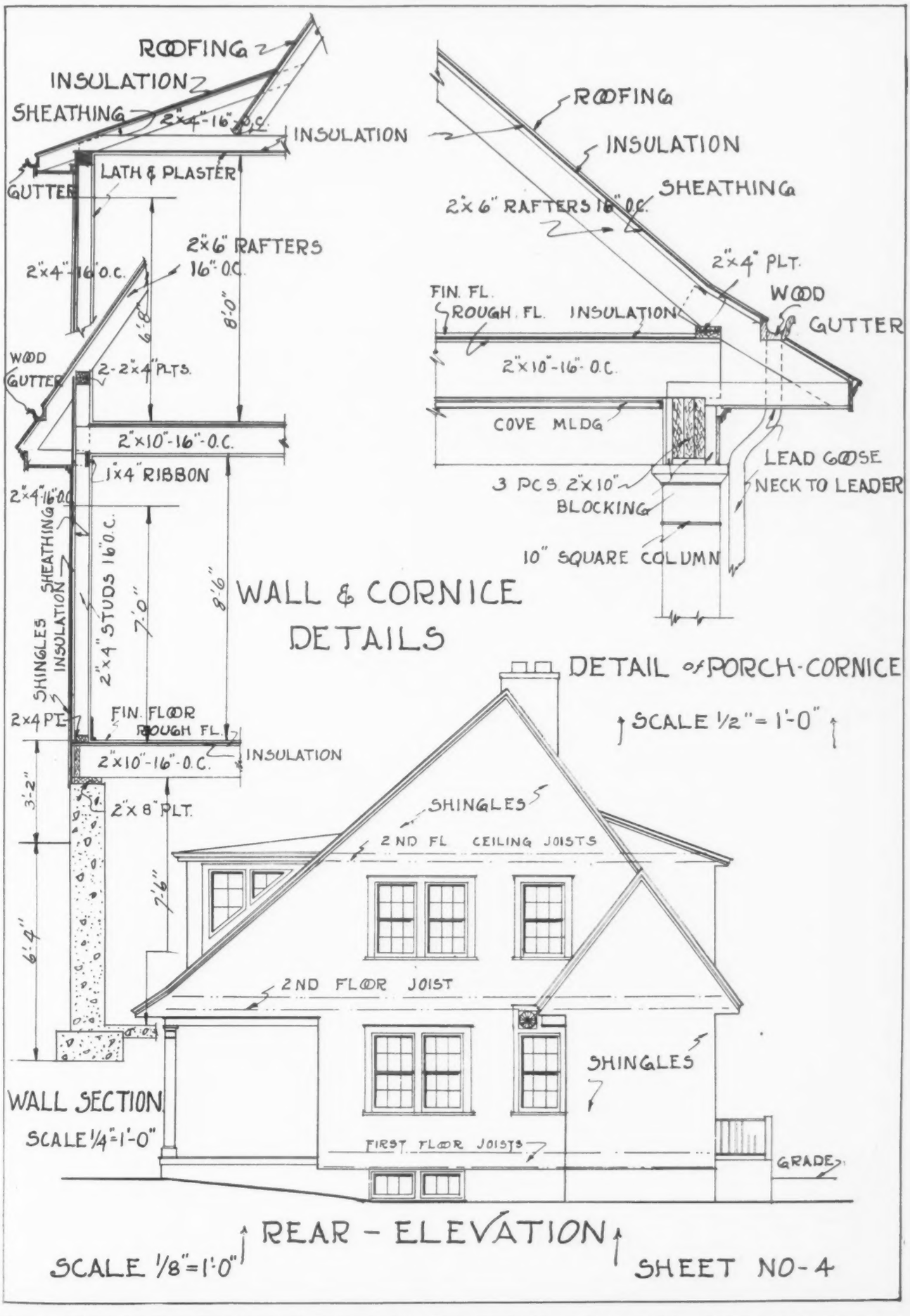
RIGHT - SIDE - ELEVATION

FRONT - ELEVATION

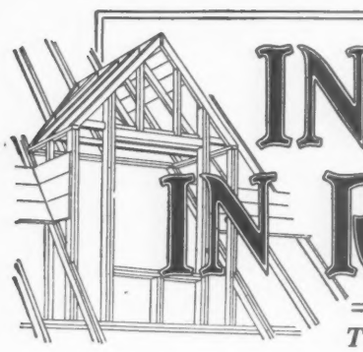
SCALE 1/8"=1'-0"

SHEET NO-3

In the Right Side and Front Elevations of Our Front Cover Home, We See the Treatment of the Open Porch and the Sleeping Porch Above and Also of the Entrance and Chimney Details Which Face the Street.



Here Is Shown the Rear Elevation at the Bottom of the Page While Above It Are Details of Wall and Cornice and of the Porch Cornice Completing the Working Plans for Our Front Cover Home.



INSTRUCTIONS IN ROOF FRAMING

This Department Appears Every Month in American Builder—Editor

A Study of Lean-to Rafters

By JOHN T. NEUFELD

IN this lesson we present an interesting problem of framing a lean-to roof. At first sight it may not appear difficult, however, numerous attempts of carpenters to solve similar problems have proven that such a problem is rather difficult, unless well understood.

When a rafter of any pitch frames to a horizontal piece such as the plate, the problem is not difficult because we have a horizontal line to frame to. The same thing holds true for the upper end of rafters where they frame to a ridge pole. The ridge pole always has a vertical position. When, however, one rafter frames to another rafter having a different pitch, then the problem is more difficult. This is the case with the lean-to rafter illustrated. It is impossible to find directly any two numbers on the square that will give the cut for the upper end of the lean-to rafter.

When such a problem is involved we should first lay out a horizontal line and then work from this horizontal line, this requires two applications of the square.

In the problem of this lesson we use the numbers giving the rise per foot run of the lean-to rafter to lay out a horizontal line at the upper end of the rafter. From this horizontal line we can lay out the line of the main rafter of the building by using the numbers that give the rise per foot run of the main rafter.

This method of obtaining the cut or bevel of different framing members may be used for various cases, whenever two members both making an angle with the horizontal line are to be membered. Another example of this kind would be found in the gambrel roof where the lower and upper rafters meet. The problem is similar only that in the case of the gambrel roof the angle made is different.

Questions

1. A lean-to roof framing to a main roof has a pitch equal to a 4-inch rise per foot run. The main roof has an 8-inch rise per foot run. The plate of the lean-to roof is 2 feet lower than the plate of the main roof. If the width of the shed is 6 feet, at what point would the lean-to or shed rafter and the main meet?

2. If the shed rafter was changed to a 6-inch rise per foot run, at which point would it meet the main rafter?

3. What two sets of figures would be used on the square to obtain the cut at the upper end of the lean-to or shed rafter?

Answers

1. In this problem the shed is 6 feet wide. The pitch of the shed rafter is equal to a 4-inch rise per foot, therefore in 6 feet this rafter would rise 6×4 inches $= 24$ inches and would theoretically meet the main rafter at the edge of the main wall plate.

2. If the rise of the rafter is changed to 6 inches per foot run, then it would rise 6×6 inches $= 36$ inches for the width of the shed and as the wall plate for the shed is 2 feet lower than the wall plate of the main building, then the shed rafter would come 1 foot above the main wall plate at a point directly above the outside edge of the main wall at this point. Therefore where the main wall rafter starts the edge of the shed rafter would be 1 foot higher than the main wall rafter.

As the main wall rafter rises 8 inches per foot and the shed rafter rises 6 inches per foot, the main wall rafter would gain or would be nearer to the shed rafter, 2 inches for every foot of run. To gain the 1 foot in the height would require 12 inches divided by 2 equals 6, say 6 feet of run. Therefore the edges of the two rafters would in this case meet at a point 6 feet inside the main part of the building.

3. We would first use the numbers 6 and 12 to lay out the horizontal line as the shed rafter has a 6-inch rise per foot run. Then the numbers 8 and 12 taken on the square would be used to lay out the line that the main rafter makes on the shed rafter as the main rafter has an 8-inch rise per foot run.

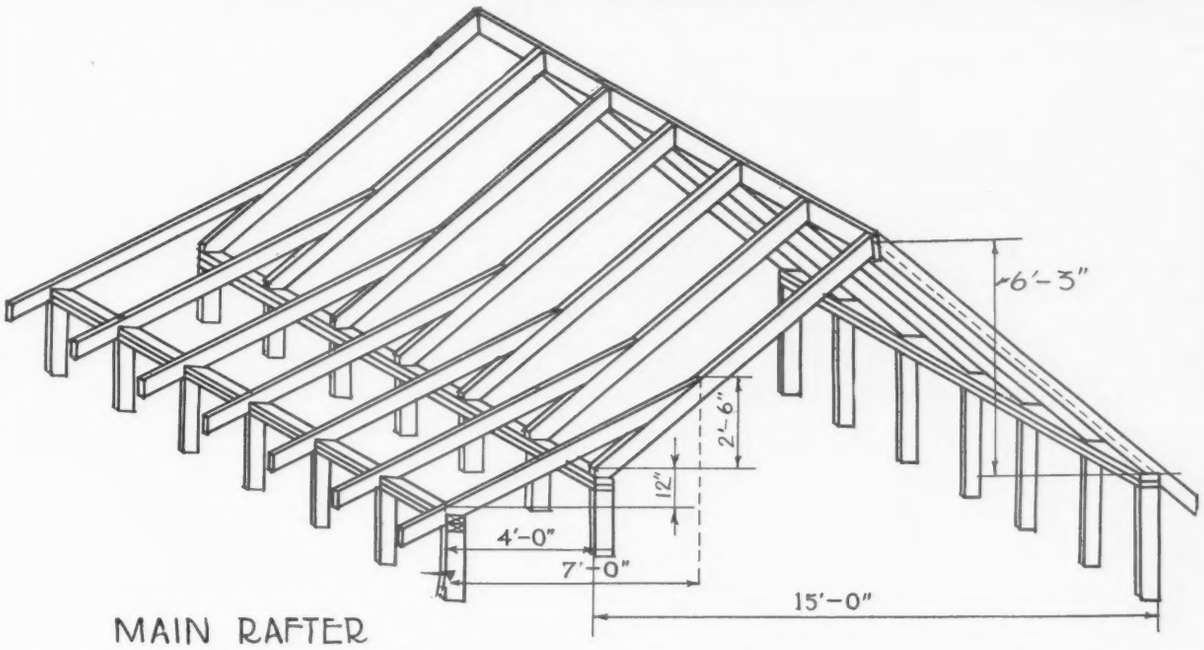
✣

Leveling the Peaks

MUCH has been said of late about winter construction as one of the agencies in leveling off the seasonal peaks and depressions which are so generally harmful to industry and business. A full realization of this leveling process would go far toward permanently stabilizing business and establishing prosperity.

It has long been an accepted theory that government expenditures should be made, as far as practicable, to secure the advantages of slack season prices and at the same time benefit industry and the public by helping to keep up production on a normal level. Evidence of the practical application of this theory was recently displayed in the Navy Department.

The Navy uses an enormous amount of lumber, so much in fact that it constantly has $5,000,000 worth of stock on hand. In a letter to the National Lumber Manufacturers' Association, making known the Navy's intention of depending in all of its purchases upon American lumber standards and the inspection services of the regional associations of lumber manufacturers associated with the National, the Bureau of Construction and Repair states that it intends, so far as practical, to govern its purchases so that quantities will not upset the market and will help to eliminate the seasonal characteristics of the lumber market. Here is a policy which should prove profitable to many heavy purchasers, not only of lumber but of many other building materials, and beneficial to the industry as a whole.



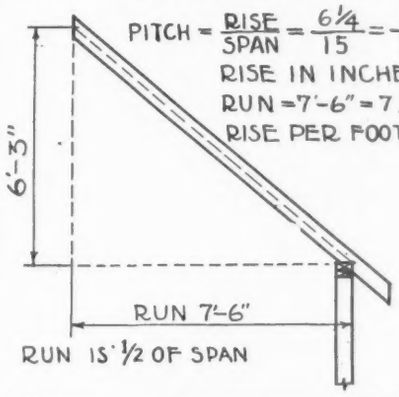
MAIN RAFTER

PITCH = $\frac{\text{RISE}}{\text{SPAN}} = \frac{6\frac{1}{4}}{15} = \frac{5}{12}$

RISE IN INCHES = 75

RUN = 7'-6" = 7½ FEET

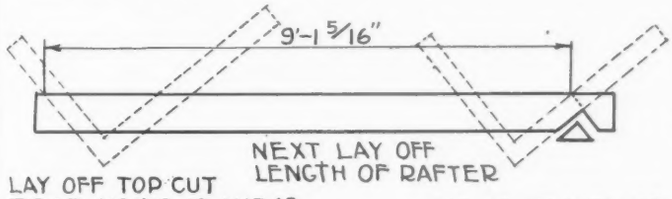
RISE PER FOOT RUN IS 75 ÷ 7½ = 10"



RUN IS ½ OF SPAN

LENGTH PER FOOT RUN $\sqrt{12^2+10^2} = 15.62"$

LENGTH OF MAIN RAFTER = 15.62 X 7.5 = 109.34" = 9'-1 5/16"



LAY OFF TOP CUT FIRST USING 10 AND 12 ON THE SQUARE

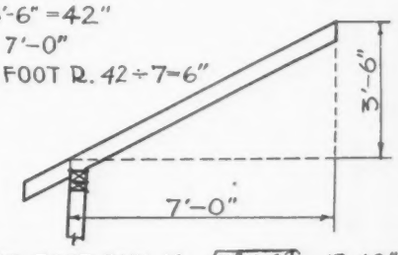
FOR SEAT CUT USE SAME NUMBERS AS FOR TOP CUT

SHED RAFTER

RISE IS 3'-6" = 42"

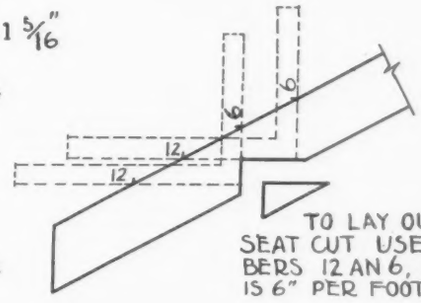
RUN IS 7'-0"

RISE PER FOOT R. 42 ÷ 7 = 6"

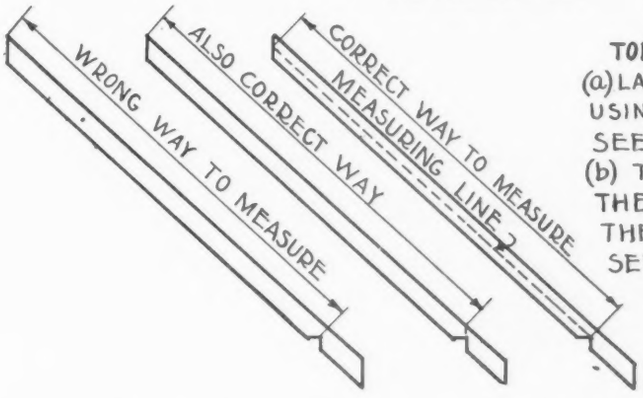


LENGTH PER FOOT RUN IS $\sqrt{12^2+6^2} = 13.42"$

TOTAL LENGTH IS 13.42 X 7 = 93.94" = 7'-9 15/16"



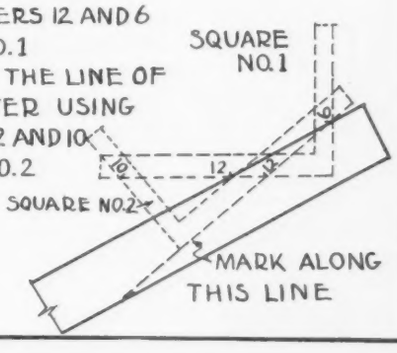
TO LAY OUT THE SEAT CUT USE THE NUMBERS 12 AN 6, AS THE RISE IS 6" PER FOOT RUN



TOP CUT OF SHED RAFTER

(a) LAY OUT A HORIZONTAL LINE USING THE NUMBERS 12 AND 6 SEE SQUARE NO. 1

(b) THEN LAY OUT THE LINE OF THE MAIN RAFTER USING THE NUMBERS 12 AND 10 SEE SQUARE NO. 2



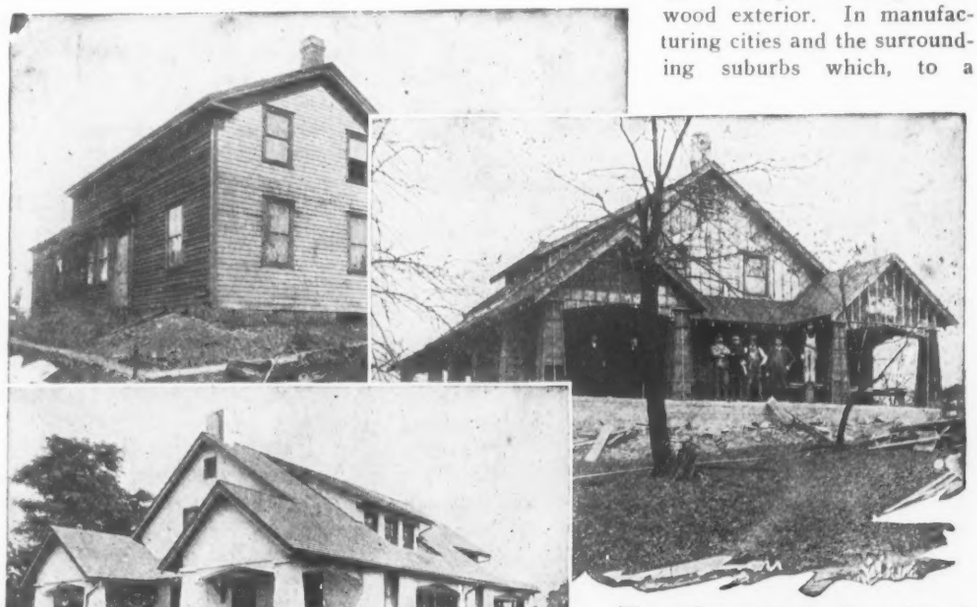
Better Plastering

Economies and Details of Stucco Overcoating

IN countless wooden houses built in every nook and hamlet in the country, many of them in various stages of dilapidation, because of the increased cost of painting so as to make a presentable appearance, the matter of stucco overcoating is of great interest to the contractor and builder. The architect, too, will be interested in knowing just how others have successfully solved the problem covering construction details, and so this article on overcoating will be one of two presented in succeeeding issues, to cover both the general principles and actual construction details.

General Principles

Sooner or later many wooden houses come to the end of their period of service. Lack of proper painting and the repair of decayed and rotted timbers supporting porches, and stairs, or the extreme weathering of the trim and siding are the principal causes for deterioration and final ruin. The cost of such upkeep mounts steadily as the building ages; as it reaches its climax the encouragement for maintaining it in good shape dwindles, is finally submerged, and the result is that there are countless old decrepit wooden houses in our cities and on our farms the country over.



Three Stages in the Restoring of a Decaying Frame House, to Beauty and Long Life, by the Application of Good Design and Stucco Over Metal Lath.

Such a house is not beyond repair, however. If the framework is sound and the interior in fair condition (and buildings erected a generation or more ago were generally built for hard usage and had a good foundation) it can be salvaged and yield a high rate of return on the investment. The general principle is to place a new stucco exterior over the old weatherboarding, "overcoating" as it is termed, and thus save the building from further depreciation and upkeep for painting. If the siding is loose and shaky it may have to be removed or renailed, otherwise the metal lath or a similar stucco base is applied over building paper nailed directly to the old siding and the work proceeds essentially as in stucco over sheathed construction, as described in a preceding article in this series.

Almost any type of old building can be renovated at relatively small expense when compared with the results achieved. Nor is overcoating limited to wood frame buildings. Old porous brick or stone walled buildings, painting of which only seems to accentuate their drab appearance can best be modernized by covering them with stucco applied over metal lath. Again, many seekers after a house that possesses individuality and yet is relatively low in cost, deliberately search out some old frame dwelling built in the days of Colonial simplicity and integrity, whose heavy timbers, rough hewn, make a firm foundation for the new exterior that is planned.

Science, also, has uncovered a point in favor of the overcoating, as it has been found to make a house much warmer and comfortable than an uncoated old house which, racked at doors and windows, permits more cold air to enter than can be warmed up to the proper temperature.

There are very good reasons for overcoating an old house and these will be discussed at length under the headings of:

(1) Permanent exterior saves painting costs.

(2) Large items in cost for repairs eliminated.

(3) Overcoating adds to warmth of house and conserves fuel.

(4) Greater attractiveness adds to resale value of overcoated house.

Permanent Exterior Saves Painting Costs

Painting is one of the largest items of upkeep expense in the average building with wood exterior. In manufacturing cities and the surrounding suburbs which, to a greater or less extent, are subject to the smoke evil, it is often necessary to repaint every year. Painting in residential communities remote from manufacturing centers must be done at intervals of two years and not exceeding three years. If this maintenance is permitted to lapse, the buildings will take on a shoddy, unkempt appearance such as is sometimes seen in communities lacking in civic pride.

Such a neglect is derogatory to the best interest of a neighborhood, and will most certainly result in a decline in value not only of the houses of the neglectful owners, but those of their neighbors as well. If allowed to continue, the surface will deteriorate, and eventually serious decay may set in. Painting is imperative if expensive repairs and possible large financial loss is to be averted.

Contrasted with the large amount of wood exterior, in the wood-sided house, which requires repainting, the stucco house has but little that needs attention. This consists principally of the wood trim around doors and windows, the wood coping on porches, the steps, and sometimes the porch floor (although the latter is frequently of cement or brick construction) and frequently the soffits at the eaves. The home owner can himself, readily repaint this comparatively small area every other year, whereas he would contemplate with many misgivings the much larger task of painting a wood-sided house.

An Old Frame House, Built Many Years Ago, at Last Began to Show the Effects of Age and Weather.

After an Overcoating Treatment the Old House Could Not Be Told from a New Stucco Home.

Painters, in estimating the cost of painting, consider not only the approximate superficial area, the present condition of the surface, and the colors wanted, but also the accessibility, need for ladders, or hanging scaffold, etc., and usually quote a lump sum for the contract. With the present prices of labor and materials it can be safely assumed that the cost of two-coat repainting will approximate 75 cents per square yard. For the average two-story house, 20 by 30 feet in plan and having about 275 square yards of painting surface, the cost will be in the neighborhood of $200.

As against this there will be only 55 yards of trim, soffits of eaves, porch floors, etc., to paint on the stucco house which at a somewhat higher rate on account of scaffolding, etc., will cost approximately $50. This, relatively small amount of painting, as has been said before, is frequently done bit by bit by the householder himself. In any event there is a distinct saving of $150. Assuming that this repainting is done every third year the average extra cost per year of painting a wood-sided house will be $50. This, capitalized at 6 per cent, is the annual income on $833.

To put it another way the saving in painting costs alone justifies the owner in spending $833, for placing a stucco overcoating on his house over the wood-sided frame. If he does his own painting of the trim on the overcoated house he would be entitled to a total saving which capitalized would justify an investment for overcoating of $972.

Large Items in Cost for Repair Eliminated

The natural decay, caused by air and moisture, to structures built of wood requires constant expense for maintenance of such parts of the exterior as steps, stair-railings, porch columns, balcony railings, scrolls and spindles under porch canopies. Rotting of the smaller wood details, mill-cut of the softer woods because of the greater ease of sawing, requires constant patching to insure a presentable appearance.

The use of "ginger-bread" ornament is quite foreign to stucco construction and one of the first principles of overcoating is to eliminate scroll details entirely, remove spindled or slat railings, or replace by solid stucco covered balustrade, and cover wood columns, unless of modern construction, with imperishable stucco. The elimination or preservation, under an overcoating of stucco, of the more decayable parts of the exterior thus saves a large amount in repair bills.

A conservative estimate of the amount of such maintenance other than painting required to preserve, unimpaired, the original value of the exterior of a wood-sided house of the dimensions used in the computation in the preceding section of this chapter would be $25. Capitalized at 6 per cent it represents the income on $416. This means that overcoating justifies an expenditure of $416 to eliminate repair bills amounting to $25 each year.

Before Overcoating, the Residence Above Was Plainly Old-Fashioned and Unsalable, but When Stuccoed, as Shown at the Right, Its Entire Appearance Was Changed and the Modernized Home Found a Ready Market.

Overcoating Adds to Warmth of House and Conserves Fuel

A continuous overcoating of stucco placed over an old sided house prevents, in a large measure, the leakage around door and window openings, and in the countless other cracks and crannies which open up as a building racks with age. The overcoating stucco construction presents a triple bar to air currents. There is first, next to the old siding, a non-conducting air space between it and the waterproofed building paper. Next we have the wind-tight building paper itself on top of which we have the third barrier, the 7/8-inch solid stucco slab keyed, unbreakably, to the metal lath.

The results of the heat conservation tests made by Professor Peebles, at Armour Institute of Technology, showed that overcoating a house with metal lath and stucco reduces

the conductivity of the exterior wall by 15.7 per cent with a corresponding decrease in the fuel bill. As the wall area comprises about 85 per cent of the total exposure the decrease in the fuel costs will be approximately 13.3 per cent.

Applying these figures to the residence we have used in these discussions we will save, on the 12 tons of hard coal required to heat an average house of this size, in about the latitude of New York or Chicago, about one and three-fifths tons which, at the present price delivered of $17 a ton, means over $27 a year, enough in itself to pay the interest on the cost of overcoating. Capitalized at 6 per cent it represents the interest on $450.

Greater Attractiveness Adds to Resale Value

The added value given to an old frame house, merely by covering its wood-sided exterior with a stucco covering, seems remarkable when considered in the light of the moderate cost of this improvement. Subconsciously, the buyer of a home weighs the different items of location, appearance, probable upkeep expense and cost of fuel and, on his mental reaction, bases his judgment of its value to him.

The location of the house necessarily remains the same, therefore, as between the old house and its overcoated successor, appearance, is the first of the points of judgment which the purchaser is called on to decide. Stucco, as has been pointed out before, blends harmoniously with all manner of landscaping features, with trees, shrubbery, flowers, lawns, garden pools, fountains, pergolas, garden seats and, as it ages with time, becomes an integral part of the landscape and never stands apart from it as houses built of other materials sometimes do.

Then, too, there is the sense of permanence and resistance to external fires which the expanse of stucco surface lends to the whole scene. Therefore, as the prospective owner looks forward to his declining years he naturally hopes to be possessed of a house whose permanence and remoteness to destruction from fire is assured. In this way the real money value of overcoating the old frame house is definitely demonstrated.

Furthermore, there is the matter of upkeep expense. When those who have heretofore been content with paying rent for shelter first contemplate owning a house they are frequently discouraged from attempting a complete investigation by the aspect of the large upkeep expense attendant on the depreciation of the house by time and the elements. These points have been fully considered in the first paragraphs of this article, and the large reduction in painting and repair expense of the overcoated house is a pointed argument for the increase in sale value of an old house which has been given a new exterior of stucco.

Coupling with these, the undoubted saving in heating expense, it justifies in the average house we have used in this discussion, an exditure of over $1,700 for overcoating, a sum much larger than is usually needed. We have altogether a most telling group of arguments favorable to overcoating. Details of construction will appear in the next article.

This Window Display of H. J. Shearer & Co., of San Antonio, Texas, Shows How Attractive a Display Can Be Made with Photographs of Completed Homes and a Miniature Model of the Grounds Giving an Idea of the General Layout.

✣

To Reduce Waste in Wood Use

USE more wood to save wood. This is the seemingly paradoxical impulse behind a plan developed to benefit the general public, at a meeting held April 28, in Washington. How to conserve wood by using more of it is explained by sponsors of the plan, who contend that there is no need to decrease the use of it here in the United States, but there is a real necessity for utilizing the felled tree to a greater extent. That is how it is hoped to make our wood resources go further by using as much as possible of every piece and not wasting so much. In other words, don't use only the choice cuts and waste the rest just because it's an old custom.

A definite program of procedure throughout the nation and the appointment of sub-committees to handle the various projects under consideration were worked out at this meeting of the National Committee of Wood Utilization, which is an official group organized in the Department of Commerce.

It seems that much timber, after it leaves the forest and becomes lumber, has not been used to full advantage. This sometimes has been due to an element of carelessness, many consumers taking it for granted that there is plenty of lumber and there was little need to economize. Others have specified only the best grades of lumber because they did not know that certain cheaper grades, for which there is not so much demand and which is naturally cheaper, may often serve the purpose just as well.

A continued large demand for high grade lumber will create abnormal prices for upper grade stock, for the lumberman must charge his chief cost items against these qualities. On the other hand, the greater portion of the production consists of common grades of lumber, for which the demand is less active. The National Committee plans to develop a program which will promote in the manufacturing industry more extensive wood utilization, especially of the lower grade stock. Reduced saw kerf, prevention of stain, wood preservation, more efficient logging methods, utilization of small logs, possibility of using a greater variety of species for pulp manufacture and chemical utilization will be among the measures.

✣

"THE house plan should be adapted to the size and shape of the lot. Broad lots should have a type of plan in which the broad side of the house faces the street. When shallow lots force the placing of the house near the street, the use of hedges, gateways and enclosed porches will partially offset this disadvantage."

✣

"FOR appearance as well as for good drainage, the ground should slope away from the building in order that the building may not seem to be standing in a hollow."

Handsome Business Block of Hollow Tile Construction

This Business Block in Spencer, Ind., Is a Fine Example of an Attractive Structure Built to Be Permanent Both in Substantial Usefulness and in the Enduring Qualities of Its Appearance.

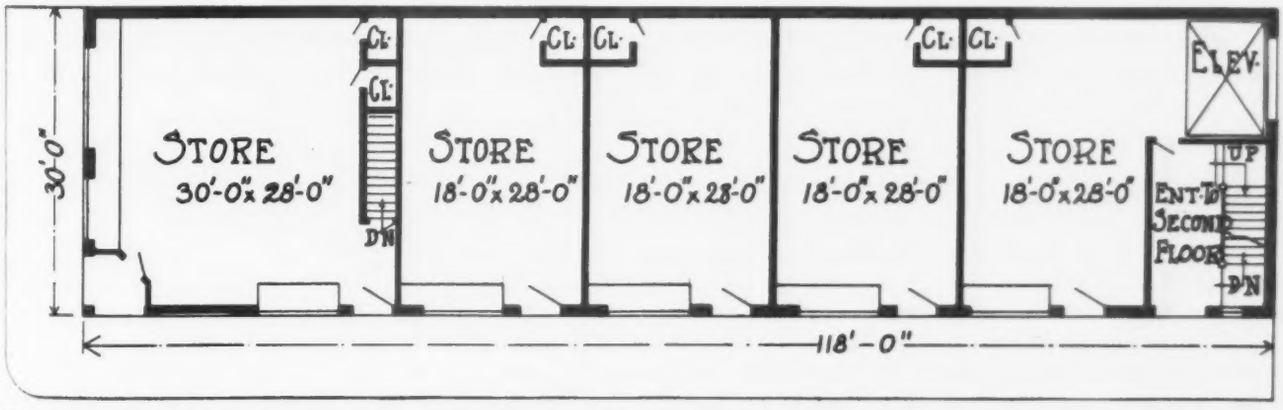
ON one corner of the public square, in Spencer, Ind., there is a new business building which is destined to be a permanent asset to the city. This is the Viquesney Block, recently built by E. M. Viquesney, to house the business of the Imp-O-Luck Company, which he owns. The company's quarters occupy the entire second floor, while the first floor space has been divided into five store rooms which serve as rent producers to help pay for the building.

This building makes an unusually fine appearance. It is built of a glazed, hollow brick or tile of a yellowish tan color, laid up in a cream colored mortar. The trim is of gray Indiana limestone and the combined effect has aroused admiration in all who have seen it.

The length of the building is 118 feet and it is 30 feet wide. There is a large store space at each end with three smaller stores, each 18 by 28 feet, between. At the east end a handsome covered entrance gives admittance to the second floor by way of a stairway finished in oak with mahogany trimmings. Back of it is a freight elevator serving the shipping room on the second floor.

The space upstairs is divided into a main office or general room for stenographers, an owner's private office, a bookkeeping and multigraphing office and a large shipping room. The unusually large number of windows on this floor make it remarkably well lighted and excellently ventilated even in the hottest weather. The second floor is finished in rough plaster effect with mahogany woodwork and edge grained, pine floors, stained a light oak.

There is a basement under the entire building which provides space for an efficient steam heating plant as well as storage space for the occupants of the first floor stores.



The First Story Is Cut Up Into Five Store Rooms Which Are Rented and so Aid in Paying for the Cost of Construction Involved in Providing Business Quarters for the Owner, on the Upper Floor.

A Hog House with Ample Sunlight and Good Ventilation

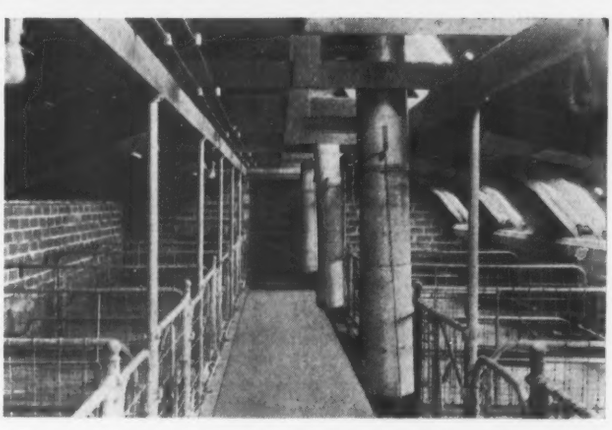
J. B. CLAY, Architect

Warm Dry Construction, Sunlight and Perfect Ventilation Make This Hog House a Permanent Addition and a Real Asset to the Farm.

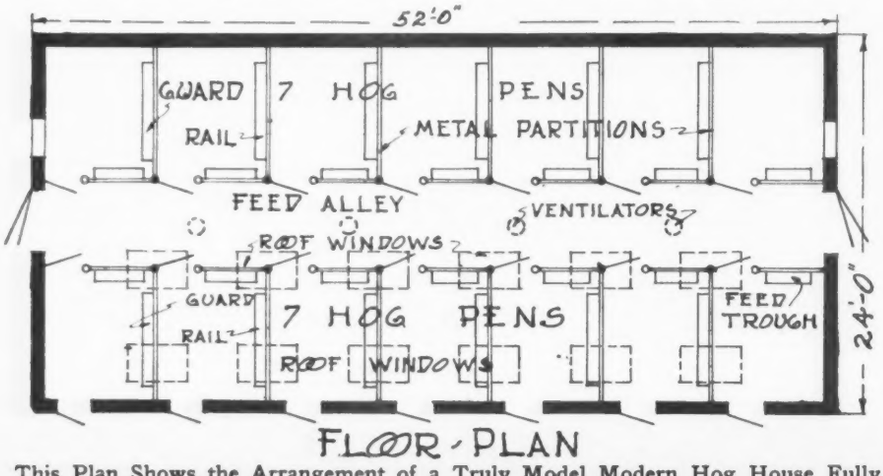
THE hog house pictured here is truly a model hog house for it displays three points of excellence which, taken together, are the fundamental requirements for the proper housing of the herd. The first of these is the construction of the building. Built of tile on solid concrete foundations and with a concrete floor it is warm and tight, protection against the most severe weather and a permanent addition to the group of farm buildings.

The second important feature is the roof design and window arrangement which provides the maximum amount of sunlight during the greatest part of the day. This design is best adapted to a hog house running east and west with the windows exposed to the south. For a hog house which has a north and south length the gambrel roof type of construction is probably better.

These points of general construction and lighting take care of the essentials of warmth, dryness and ample sunshine which are required for a healthy herd of hogs. The other essential is proper ventilation. This latter point is provided for in this house by means of a special ventilating system which assures plenty of fresh air at all times, without drafts, and precludes the accumulation of foul air, odors and moisture.



Here Can Be Seen a Portion of the Ventilating System, the Steel Pens and Drainage Gutters.



This Plan Shows the Arrangement of a Truly Model Modern Hog House Fully Equipped to Care for the Herd to the Best Advantage and Most Economically.

Especially in the cold weather period the sweaty, steamy air which results from lack of proper ventilation is a breeder of germs and frequently results in the loss of a large proportion of the young pigs. The cost of a good ventilating system will be very quickly overcome by the saving of young pigs and the improved health of the whole herd.

Though the points already mentioned are the conspicuous features of this hog house, other interior equipment should not be overlooked. The interior view shows the best modern steel pens, and the drainage slope and gutters which assist so greatly in keeping the house always clean and sanitary.

In Gas Heated Houses Insulation Proves Its Economy

Actual Records from Peoples Gas Light & Coke Company Show Savings in Chicago

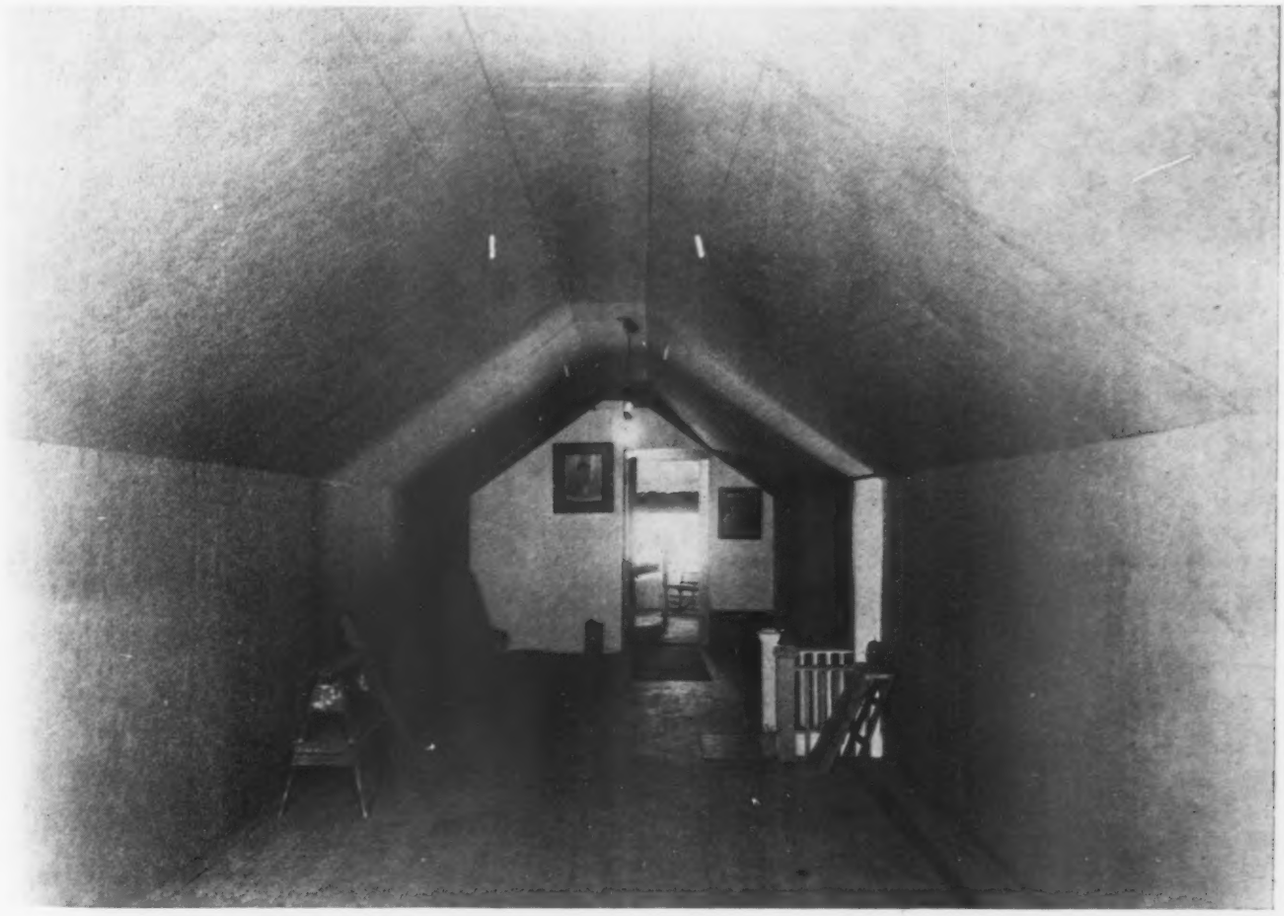
AN increasing number of home owners are turning to the comforts and convenience of gas-fired boilers or warm air furnaces for almost ideal heat at the turning of a valve—even that being done by the thermostat. Of the various products consumed in any building, gas is probably the most dependable, from the standpoint of unfailing supply. It is ready for instant use, at its maximum efficiency, day or night.

From the standpoint of cost, gas costs no more than several other types of fuel, especially when the house is properly insulated with efficient heat insulation in the walls and ceilings. It is, however, distinctly a fuel for those who have the money for modern housing conveniences and who are willing to pay a fair price for the comforts they demand.

Builders and owners unfamiliar with gas heating costs will discredit mere assertion, so the Peoples Gas Light and Coke Company of Chicago, and gas companies in other cities are willing to make public their records. In order to prevent waste which might, otherwise, make the cost excessive, these companies are educating the public to the economies of proper heat insulation under the roofs and between the walls of their buildings. When this insulation is installed in a new building and gas used for heating at the beginning, there is, of course, no comparison of heating costs with and without insulation. Such comparisons are only possible where the house is built without insulation, uses a gas-fired boiler or furnace for at least one cold weather season and then installs heat insulation. The difficulty is, in the latter case, that heat insulation is almost never installed in the walls of a house once it is built without it. What happens in most cases is that the owner applies the heat insulation only over his top ceiling, where 60% of the heat loss occurs. Therefore, the comparisons we are able to give—while they do show economies for insulation—only show 60% of the economies possible with full insulation.

The advantages of proper house insulation are by no means confined to the cold weather season; houses so protected are much cooler and more comfortable during the summer weather. This is especially true in the case of bungalows, story-and-a-half houses and Dutch Colonials where there is little or no intervening attic space to mitigate the rays of the sun. Even full-sized attics, however, give but partial protection, winter or summer, and there is a heavy winter heat loss through them.

Let us turn now to actual evidence possible through the gas company's records, of the economies actually obtained through a partial use of heat insulation in homes. The first is found in the gas heating record for a five-room



After Heating for One Season with a Gas-Fired Boiler, the Owners of This Chicago Bungalow Insulated the Attic with Cane Fibre Insulating Lumber as Shown in the Picture and Effected a Saving of 26 Per Cent in Their Gas Bills During the Following Winter.

Cork Board Insulation in the Attic of This Brick Bungalow Effected a Saving of 20 Per Cent in the Gas Heating Costs Compared with the Winter Before the Insulation Was Installed.

house at 5424 Trumbull Avenue, Chicago. As shown in the illustration of the attic floor in this house, the insulation used is a sheathing board, suitable also for partition purposes, which is made from cane fibre pressed into insulating lumber 7/16 of an inch thick.

The house in this instance is heated by a gas-fired boiler and 409 square feet of radiation with vapor system valves.

The actual gas consumption before the insulation was installed from the beginning of cold weather up to June 24, 1925, was 472,200 cubic feet of gas costing $362.13. However, the following winter was colder and it has been necessary to add a sum to represent the heating cost of these additional degree-days. A degree-day is the difference between outside thermometer readings and an inside temperature of 70°. During the first cold weather season there were, up to March 23, 1925, 5,760 degree-days and during the same period of 1926 there were 6,440 degree-days, so that it is necessary to add to the first season's cost the gas which would have been required for these extra degree-days. This gives an equal basis of comparison, as follows:

Heating cost before attic insulation, 1924-25	$338.40
(Representing a gas consumption of about 421,000 cubic feet.)	
Heating cost after attic insulation, 1925-26	250.92
(Representing a gas consumption of about 321,700 cubic feet.)	
Saving from insulation	$ 87.48
Or about 26%.	

Another instance showing the economy of effective attic insulation is available in the case of the brick bungalow at 5329 North Trumbull Avenue, Chicago, heated with gas during the last two heating seasons. This bungalow has 711 square feet of hot water radiation heated by a gas-fired boiler. After one year of gas heating without insulation, cork board insulation two inches thick was installed in the attic of this bungalow and marked savings have been shown in the heating costs since this was done. Here, again, we have increased the 1924-25 heating cost to the figure it would have reached had the first season been as cold as the second. The comparison follows for the period from the beginning of cold weather up to March 23rd in each year:

Heating cost before attic insulation, 1924-25	$381.53
(Representing a gas consumption of about 489,000 cubic feet.)	
Heating cost after attic insulation, 1925-26	303.55
(Representing a gas consumption of about 389,200 cubic feet.)	
Saving from insulation	$ 77.98
Or over 20%.	

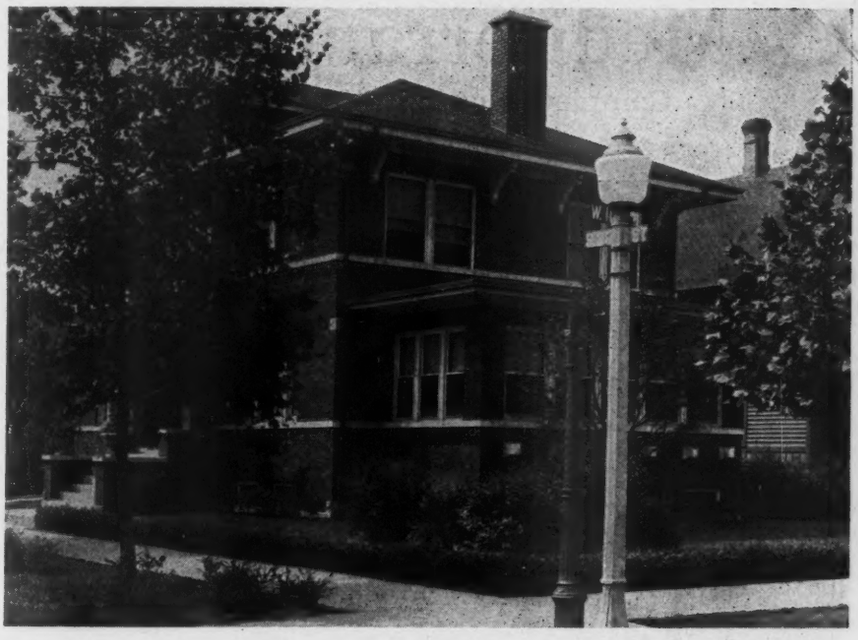
The third comparison is on a two-story brick house built prior to October, 1925 at No. 3 West 111th Place, Chicago. As will be seen from the illustration, this is a fine-looking, modern home, of considerable size. It has six large rooms, sun porch, attic and basement. The house is heated by a gas-fired hot water boiler and 920 square feet of radiation. This heating plant was operated for a full season before insulation was installed.

The type of insulation used was a gypsum mixture with a special chemical ingredient added which causes air bubbles to form in the wet mixture as it sets, filling it with minute air cells. This mixture was poured between the attic joists after the plaster beneath had been protected by placing waterproof paper over the lath. The attic is pictured among our engravings and shows a thickness of between three and four inches of insulation poured in place.

The actual heating cost with gas before the insulation was installed, from the beginning of cold weather up to April 17, 1925, was 547,400 cubic feet or $453.86. During the first cold weather season of 1924-25, there were 6,250 degree-days and during the second, 7,250 degree-days, so that it is necessary to add to the first season's cost the cost of the extra 1,000 degree-days. This makes the comparison as follows:

Heating cost before attic insulation, 1924-25	$512.30
(Representing a gas consumption of about 656,800 cubic feet.)	
Heating cost after attic insulation, 1925-26	463.24
(Representing a gas consumption of about 563,900 cubic feet.)	
Saving up to April 17th	$ 49.06

This is a substantial saving over former years. However, this house has an unusually large amount of radiation and a much greater saving can undoubtedly be shown in other installations although exact comparisons are not available at this date. Experience has shown that where houses are completely and efficiently insulated at the time they are built, a smaller gas boiler and much less radiation can be installed and will heat the house efficiently. This was the case in the new home of Mr. H. S. Ashenhurst, illustrated and described in the January issue of AMERICAN BUILDER. $236.00 in first cost was saved by the smaller boiler installed and $175.00 in the first cost of the smaller amount of radiation required. The complete heating costs with gas for this modern house in Edgebrook Manor, Chicago, are now available from the beginning of the cold weather season up to April 28th. There was a gas consumption of 232,800 cubic feet and a heating cost of $180.64, or about $1.00 per day, which is certainly very economical gas heating, clearly illustrating what good insulation will do.



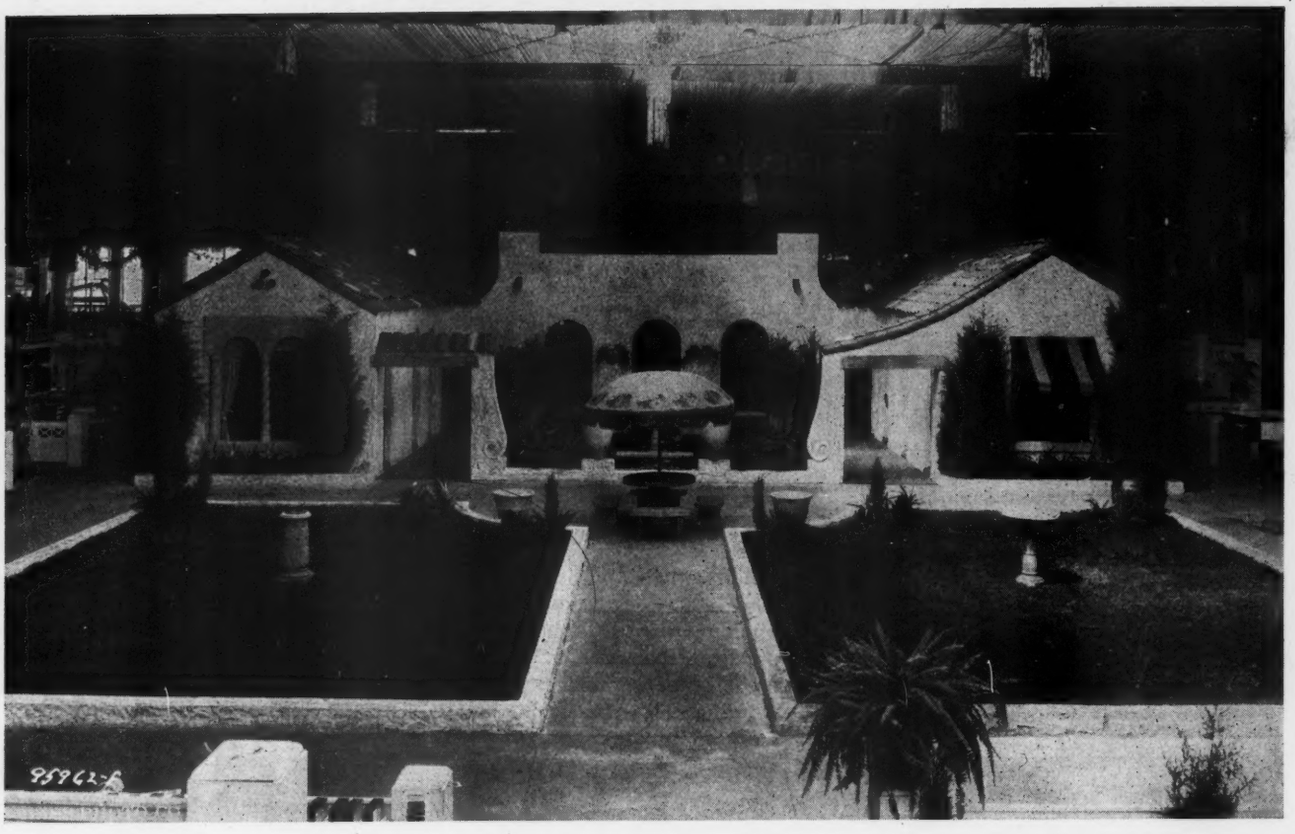
This Attractive Two-Story Brick House Has Been Heated with Gas for Two Seasons. Considerable economy was shown in the gas bills after the attic had been insulated as shown in the picture below.

Estimates of cost of heating this house with gas uninsulated were $250.00. So the actual saving by building in the insulation ran nearly 50 per cent. Several other one-story houses were insulated as before described by pouring this porous mixture above the lath and plaster ceiling. Savings ran as high as 30 per cent for this ceiling insulation alone. In addition the owners noticed that the house was much cooler in summer than neighbors' home. The insulation used in this house was the gypsum composition which sets full of minute air cells after the addition of water.

The Insulation Used in This Attic Effected Quite a Saving in the Gas Bills for the Two-Story Brick House Pictured Above. The type of insulation used is mixed with water and poured in place over the top ceiling. It adds fire resistance to the building.

A Mediterranean Style of Home

Complete House Built and Exhibited on the Exposition Floor of the Indianapolis Home Show



Built Complete on the Floor of the Exposition Building This House with Its Lawn and Patio Was the Center of Attraction at the Indianapolis Home Show and Demonstrated a New Interest, in the North, in Color as So Freely and Effectively Used in the Mediterranean Style of Architecture.

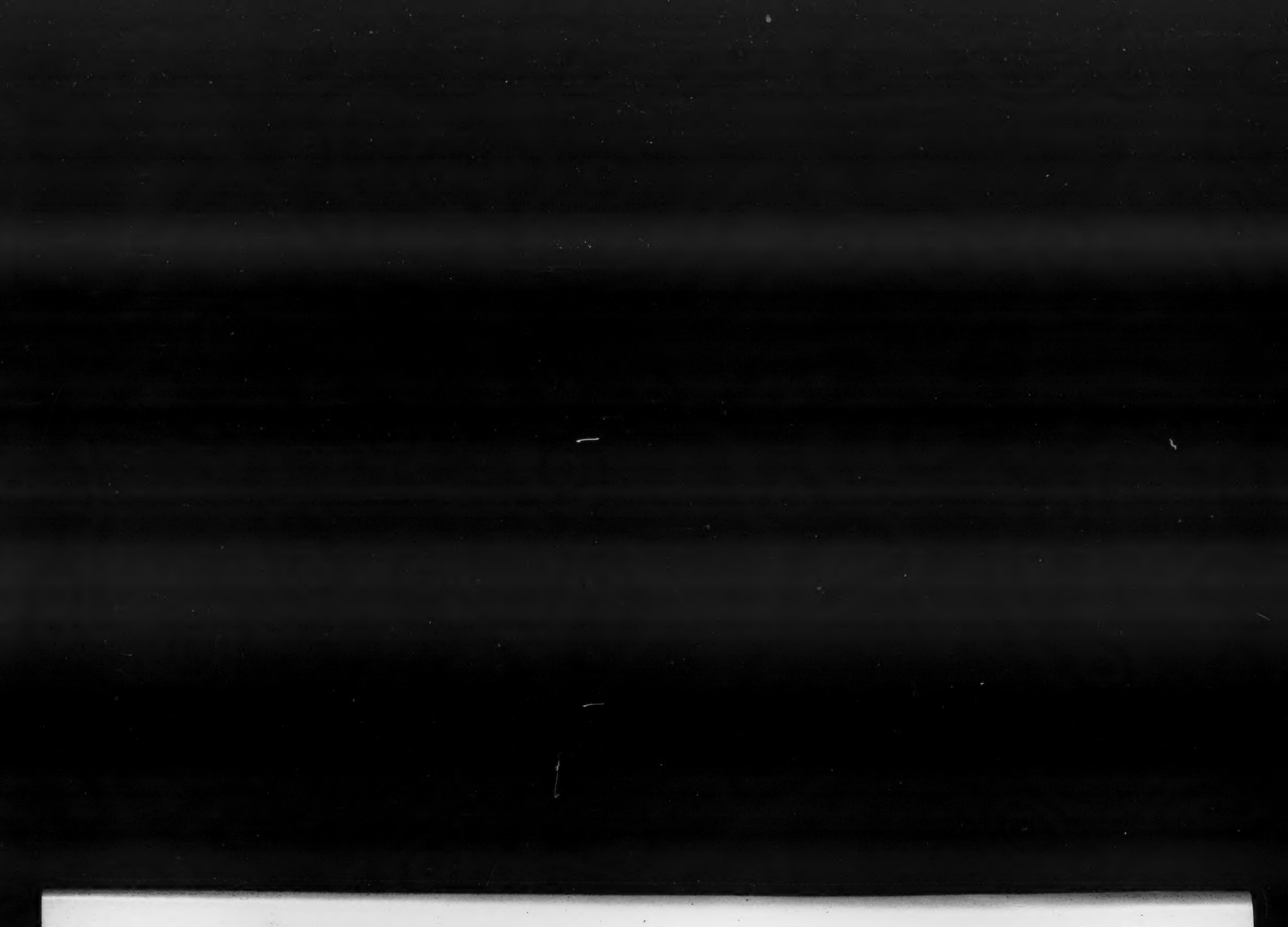
AS the central attraction of the Fifth Annual Home Show under the auspices of the Indianapolis, Indiana, Real Estate Board, a complete home, of the Mediterranean type, was constructed on the exposition floor and was inspected by the more than one hundred thousand persons who visited the exposition. This home was complete in every detail from the lawn and patio at the front to the furnishing of each room within and from the striped awnings at the windows to the electric fixtures on the walls.

The term Mediterranean type is descriptive of that style of architecture which has, of recent years, come into popularity and been developed within this country as a result of an awakened interest in color and the architecture of Italy and Spain. Color is an essential part of this style and is in evidence in the tinting of the stucco and plaster, the awnings, the draperies, and the furnishings as well as in the bright tiled roofs and painted woodwork.

The Living Room Is Typical of the Interior Style of This House Which Was Decorated and Furnished Completely in Harmony with Its Style.

Pictured here is a view of the living room of the exposition house shown as typical of the interior style of this architecture. It is marked by arched ceilings and doorways, door and window openings finished in plaster instead of wood trim, massive plastered fireplace and characteristic furnishings and fixtures.

It has been stated by those sponsoring this house that its reception demonstrated beyond question that the people of the North are becoming more greatly interested in this style of architecture and use of color which has, previously, been most extensively used in the South and on the Pacific Coast and that the annual show has done more than any other one thing to create a desire for home ownership.



HOW DAN DOES IT

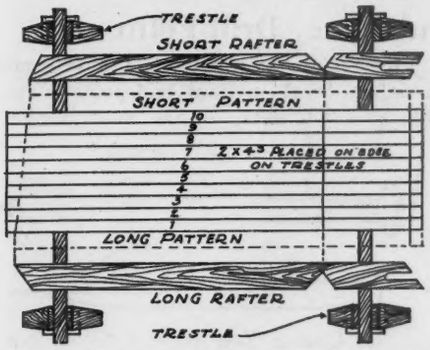
A Department for Passing "Life Savers" along to other Builders

$2 for an Idea

Dan is an ingenious cuss. Nothing ever stumps him. He always knows the way out when he runs into a tough problem out on the job or in the office. Dan is the editor of this Department and will pay $2.00 each for every good idea he can use here to show and tell other builders "how to do it." Send him a rough sketch and a short description of what the tough job was and how you handled it.

Address Dan-Do-It, care of American Builder 1827 Prairie Avenue, Chicago, Ill.

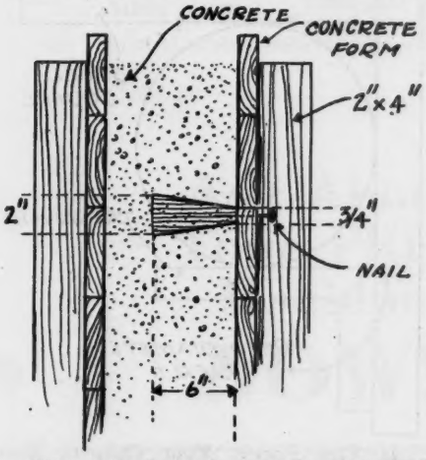
A Roof Framing Idea



Here Is a Quick and Convenient Method of Cutting Rafters on the Ground.

THE sketch shows a little idea that somebody may find worth knowing. Suppose we have a roughly laid up tile building to plate and roof and find that it is somewhere in the neighborhood of 3⅝ inches wider at one end than the other and the pitch very low, say, 5 and 12, and we wish to keep the ridge level. Place a couple of pieces of rafter timber on your trestles and lay off the pattern for the wide end of the building on one and for the narrow end on the other.

Then figure out how many rafters you will need for one side of the building. If 18 are needed, take 16 more timbers and place them on the trestles on edge and press them up tight together. Place the short rafter on one side and the long rafter on the other side of these and square across as nearly as you can at the tail or bottom end. Next mark across with a straight edge on the backs of the timbers. Number each timber, mark the faces with a bevel set to the pitch, and saw. —F. M. COFER, Elkland, Mo.



Where Shelves Are to Be Attached to Concrete Walls Plugs May Be Set into the Wall as Shown Here.

✣

Attaching Shelves to Concrete

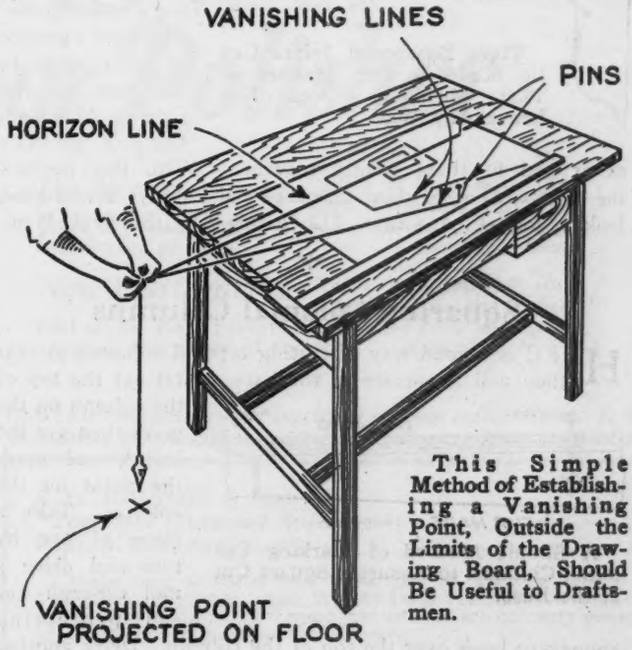
IN building concrete walls a person frequently wishes some means of attaching shelving to the wall. Plugs driven into holes bored after the wall is finished, are not always satisfactory and it takes considerable work to make the holes. I take a two by three piece of board of whatever length is desired and bevel it so that one edge is just ¾ of an inch thick, a wedge shape. I attach the thin edge to the inside form, allowing the thick edge to stand out into the wall space. I then run the concrete as usual, embedding this piece in it.

When the forms are removed the ¾-inch edge of the strip is exposed flush with the surface of the wall, providing a place for nailing or screwing on the shelves, without cracking the wall. If the strips are well painted before being used, to keep them from absorbing moisture, they will last indefinitely.—L. A. HIBPSHMAN, Deer Creek, Okla.

✣

A Perspective Drawing Kink

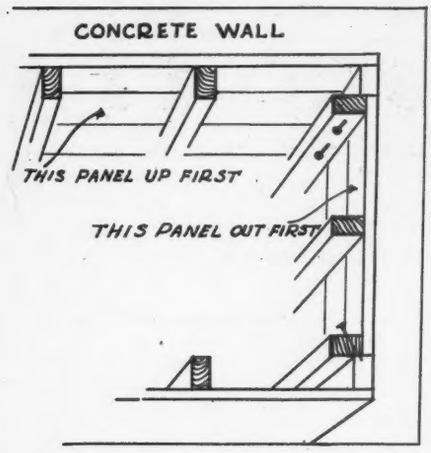
WHEN the vanishing point in a perspective drawing falls outside the limits of the drafting table, it may be easily located and used with the aid of some string,



This Simple Method of Establishing a Vanishing Point, Outside the Limits of the Drawing Board, Should Be Useful to Draftsmen.

a couple of pins and a plumb bob. One piece of string is stretched along the horizon line, while the other is used to trace out the vanishing lines on the drawing. The illustration clearly shows the method of using—E. L. GOODWIN, Warren, N. H.

Building Concrete Forms



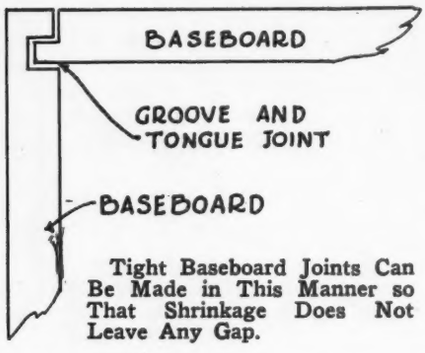
By This Method Each Side of the Concrete Form Is Built as a Separate Panel and Set Up at Once.

HERE is a sketch of my method of putting together the inside corners of forms for concrete work. This construction permits of building each side in a separate panel and setting up one side at a time. The corners are spiked together as indicated and the nails left protruding far enough to allow them to be pulled easily with a nail bar. It will be seen that the end panel can be readily taken out after the concrete has set.

One pair of panels, either the end or side ones, is made full length and the two by four studs nailed even with the end of the board. The other pair is made the same way but shorter, by the thickness of the board and the width of the two by fours on the other two sides, than the length of the wall desired.—O. P. PIERCE, Glenns Ferry, Ohio.

✣

Tight Baseboard Joints



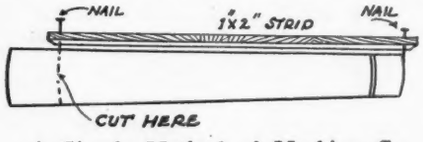
Tight Baseboard Joints Can Be Made in This Manner so That Shrinkage Does Not Leave Any Gap.

THE sketch shows my method of joining baseboards at the corners so that, when the material shrinks, they will not separate leaving a crack showing. I cut a groove ⅜ inch deep in the face of one and a ⅜ inch tongue on the other and fit them snugly together. With this method the baseboards never show shrinkage and I always have a good looking job.—C. A. CLARK, 712 Osleola Ave., St. Paul, Minn.

✣

Squaring Colonial Columns

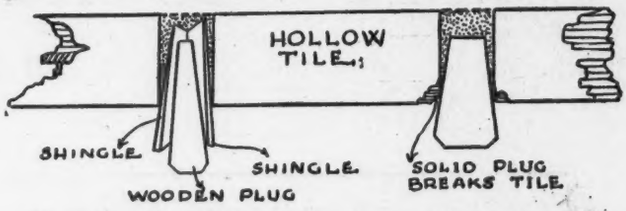
HERE is a good way of cutting tapered columns so that they will be square at the base. First cut the top of the column on the mark then get the length and mark the point on the column. Take a piece of one by two and drive a nail through one end projecting enough to hook over the top of the column. Drive another nail through the one by two at the mark on the column, projecting just enough to make a scratch. Turn the column holding the strip against it and the nail will mark it for a square cut.—E. C. FOREN, 188 McClintock St., New Britain, Conn.



A Simple Method of Marking Colonial Columns to Assure a Square Cut at the Base.

Nailing Plugs for Tile Walls

I RECENTLY ran into a job where I had to nail up a lot of base to hollow tile walls that had no wood plugs to nail the trim to. I found that, when I dug out the mortar from a joint in the wall and tried to drive a solid plug, the tile would break and the plug would not hold. By first putting two



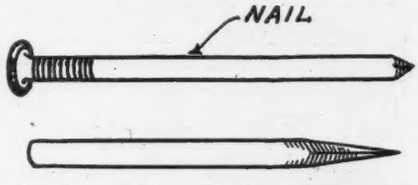
Plugs May Be Driven into Mortar Joints Without Breaking the Tile if Pieces of Shingle Are Placed on Each Side of the Plug.

shingles into the joint and the plug between them, I could drive the plug solid and the tile did not chip or break. The sketch shows the effect of trying to drive a solid plug and the method of using the shingles.—JOHN KRULISH, La Jolla, Cal.

✣

An Emergency Drill Point

A NUMBER of times while at my work I have been unfortunate enough to break my last drill point of the size I needed. That meant a delay of the work to get more drills and much inconvenience. I have found a simple means of making a temporary drill point which will prove satisfactory for such emergency use. I take a nail of same size as the drill point and file it to a sharp point, flat on three sides, file off the head so that it will fit into the drill chuck and use it as a drill. It is surprising how fast this will drill into hard woods.—GEORGE KOLKA, 2509 S. 61st Ave., Cicero, Ill.

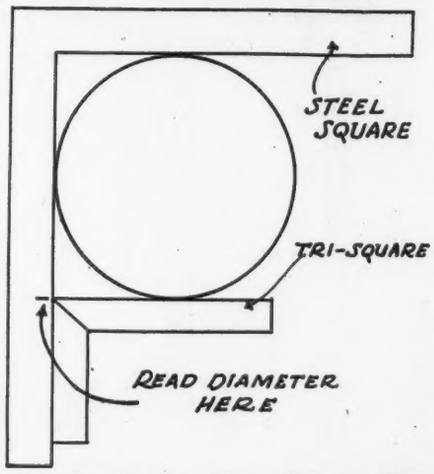


Of Course You Want a Good Supply of Drill Points but in an Emergency This Sharpened Nail Will Serve.

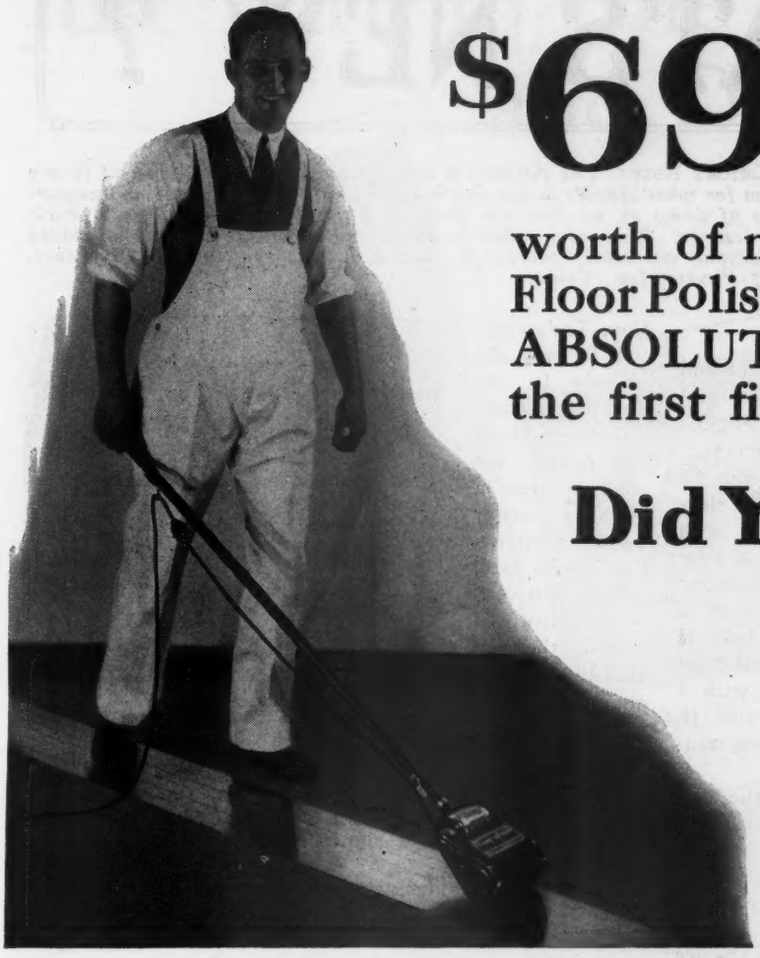
✣

To Measure a Diameter

A METHOD of finding the diameter of a circle, when no calipers are available, is shown in the illustration and is so simple that it hardly requires explanation. It can be conveniently applied to pipe, tile and similar fittings in construction work. All that is needed is the steel square and a try square. The pipe is placed in the angle of the steel square and the try square laid along the steel square and against the pipe. The diameter can then be read from the steel square at the point where the try square intersects it. —H. H. GREINER, Landisville, Pa.



If You Forget Your Calipers You Can Still Find the Diameter of a Circle with Two Squares.



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"The Floor Finishing Authorities"
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Please send details of your FREE offer on the new Johnson Electric Floor Polisher. Also WHOLESALE Price List on Johnson Interior Finishes. My name and address are correctly given on attached letter-head (or business card).

Signed.....

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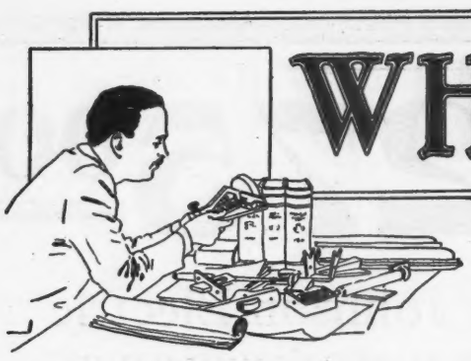


WHAT'S NEW ?

EDITOR'S NOTE: *The* AMERICAN BUILDER *does not accept payment in any form for what appears in our reading pages. In order to avoid any appearance of doing so, we omit the name of the maker or seller of any article we describe. This information is, however, kept on file and will be mailed to anyone interested; address* AMERICAN BUILDER *Information Exchange, 1827 Prairie Ave., Chicago.*

For Cutting Outlet Holes

AN ingenious tool for cutting outlet holes in plaster and wood has recently been placed on the market and should prove a handy, time saving piece of equipment for the contractor. This tool can be used with an electric drill or with a hand brace. When the electric drill is used a clean-cut hole is made in less than a minute, with a hand brace in about three minutes.

This Simple Tool Cuts an Outlet Hole for Pipes or Electrical Wiring in from One to Three Minutes.

To use the tool, which is shown in the illustration, one merely fastens it to the wall where the hole is wanted by the use of two screws. The electric drill or hand brace is attached and the cutting started. The cutting is done by four saws, made especially for this tool by a well-known saw manufacturer.

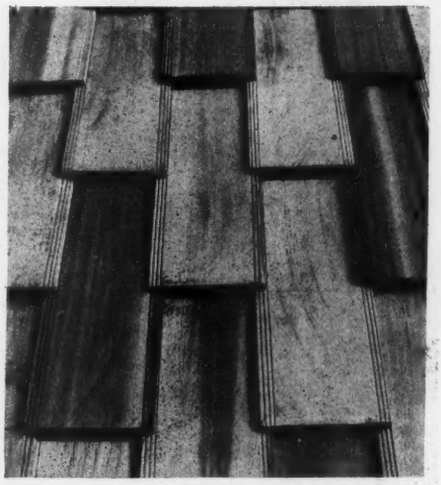
✣

Tile Effects in Wood Roofing

ROOFING, as shown in the illustration, was invented as the result of a discussion in which an architect insisted that someone ought to produce a tile effect in wood roof covering. The shingle, or wood tile, which is used is a full inch thick at the butt, 24 inches long and 4, 6 or 8 inches wide, as desired. It is laid with an exposure of 7½ inches from course to course, giving each shingle a full weather exposure of 15 inches. The total coverage per shingle is 80¼ square inches and 185 pieces are required to the square, which allows a few extra for waste.

The patented features of this shingle are the side lap and grooves. The side lap is so cut as to provide a play of an ⅛ inch, which takes care of all expansion, making the roof watertight at all points. The grooves are merely an extra precaution to assist in taking care of water drainage.

These shingles are designed to afford not only a wide exposure but also the heavy shadow line, which architects use to good advantage, and to be used as roofing tiles are used. Because of being entirely of wood and because of being as heavy as it is, breakage, common to roofing tile, is eliminated both in shipping and in application. The cost will be considerably less than that of tile and there will be an additional saving in the under roof construction. The weight will be only 250 pounds to the square, as compared with about 700 pounds for tile, so that a lighter under roof construction can be used, taking into consideration, of course, the fact that the shingles themselves have a thickness of 1 inch.



Here Is a Type of Cedar Roofing Designed to Give a Tile Effect.

This roofing already has been applied, successfully, to a number of residences, manufacturing plans are being perfected and quantity production will soon be under way. First grade will be a strictly clear, strictly 100 percent vertical grain shingle while the second grade will be of stock showing a 16-inch strictly clear face.

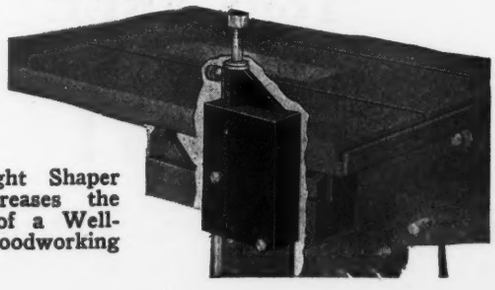
✣

New Woodworking Tool

AN interesting development in woodworking machinery is an upright shaper spindle which handles all descriptions of mouldings on curved edges. This spindle is mounted on a standard type of woodworking machine and operates in the center of the saw table. It can be put on or taken off in five minutes.

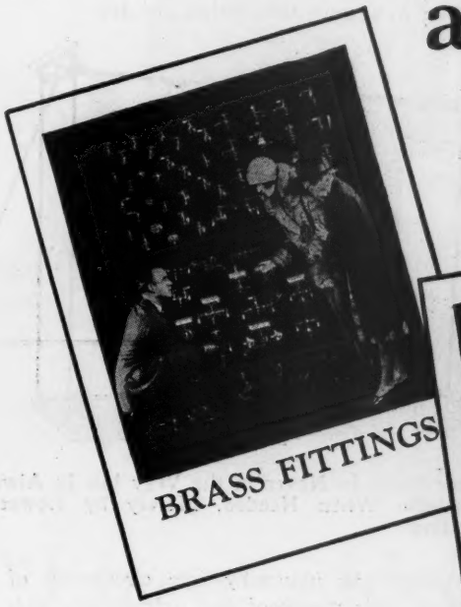
This is guaranteed to be a practical, well-made, durable tool. It is driven by a pair of tool steel, hardened, spiral gears, not bevel gears. One spiral gear is put on the saw arbor in place of the saw while the other gear is on the upright spindle. This is said to be the only shaper driven by spiral gears. Two bolts hold the attachment in place on the body of the machine. It is not fastened to the saw table in any way and the saw table is raised and lowered in the usual way to adjust the shaper cutter to the work.

This shaper runs without vibration or rattle because of the spiral gears which are said to be superior to any other type of gear for this purpose.

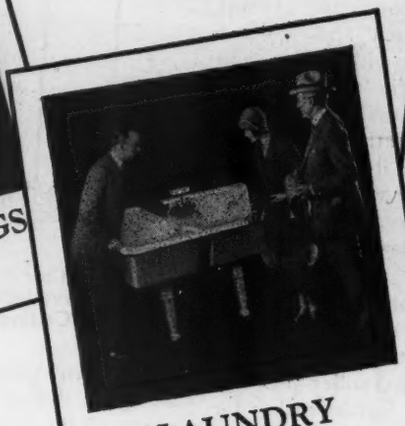


An Upright Shaper Which Increases the Versatility of a Well-Known Woodworking Machine.

Just Turn to One Catalogue and Order Them All



BRASS FITTINGS



LAUNDRY TRAYS

KITCHEN SINKS

BATHROOMS COMPLETE

WHY should you puzzle over a whole library of price lists and catalogues of plumbing fixtures?

You can run through the pages of the "Standard" Catalogue and then order, through your Plumbing Contractor, every single thing from built-in baths to laundry faucets. Thus you buy the selfsame quality in all Enameled Ware, Vitreous China and Brass Fittings.

You save a vast amount of time and bother. You rely on one manufacturer for responsibility. Your Plumbing Fixtures will look right—and perform as they look. That means satisfaction for your customer and good will for you.

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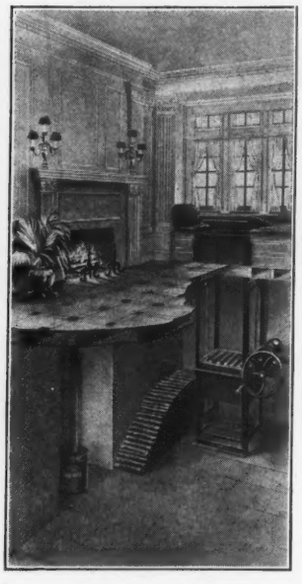
"Standard" PLUMBING FIXTURES

Let "Standard" Promotion Men prepare specifications for your houses that insure "Standard" quality throughout. It costs no more.

Fireplace Fuel Lift

UP-TO-DATE builders will now be able to render a new service to such clients as desire fireplaces in their homes. This has been made possible through the perfection of a fuel lift by a firm specializing in hand power dumb waiters, elevators and other apparatus for all kinds of vertical transportation. A fireplace is one of the most pleasing features of a home but many go unused the year around because the carrying of fuel from the basement is a disagreeable job. The hand-power fuel lift does away with all untidiness and inconvenience.



A Hand-Operated Fuel Lift for Supplying the Fireplace Saves Labor and Eliminates Messiness.

This device consists of a box traveling in vertical guides raised and lowered by means of a rope and drums. The entire equipment is in the basement and so disposed that the box, at the top of its lift, rests inside a fixed wood box beside the fireplace, or in a convenient window seat, or in the bottom of a nearby closet.

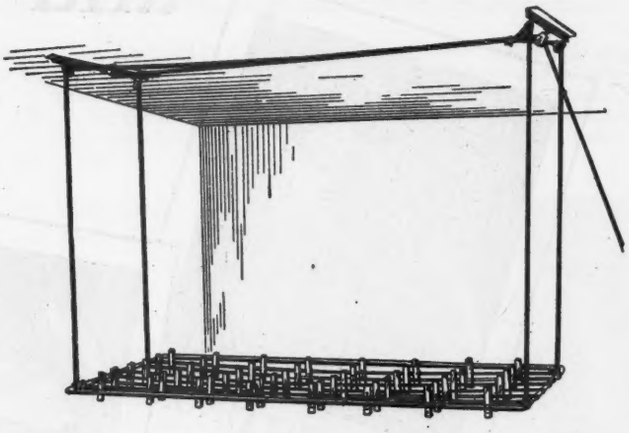
The fuel lift may be of wood or metal. The machine parts are fitted with anti-friction, roller bearings and every feature makes for quiet, easy operation, including an automatic brake. The box or car may be designed to carry wood or coal, or both. In some homes it is possible to locate the lift in such a manner as to conveniently serve more than one fireplace and it is sometimes installed to serve a kitchen range.

This outfit is another of those household conveniences which help to make the home more livable and it saves wear and tear on furniture, floors, trim and floor coverings. At the same time it eliminates much stair climbing and helps to make the fireplace useful as well as ornamental.

✣

Convenient Clothes Drier

THE illustration shows a clothes drier which can be hung anywhere and is always out of the way when not in use. It is simply suspended from the ceiling by pulleys. When not in use it is pulled up close against the ceiling by means of a rope or cord. When the time comes for drying clothes, it is lowered, in the same manner, to just the right height, the clothes are hung by means of the pins which form a part of the drier, and the drier can then be raised again, out of the way, until the clothes are dry.



This Clothes Drier Is Never in the Way but Is Always Quickly Available When Needed, Merely by Lowering from the Ceiling.

This drier allows an unusually free circulation of air for quick drying, it is rustproof and unbreakable and, because of its light weight is easily portable and easy to install. It should last a lifetime. The clothes pins are so attached that they cannot drop off and the whole appliance is so easily handled that no assistance is ever required.

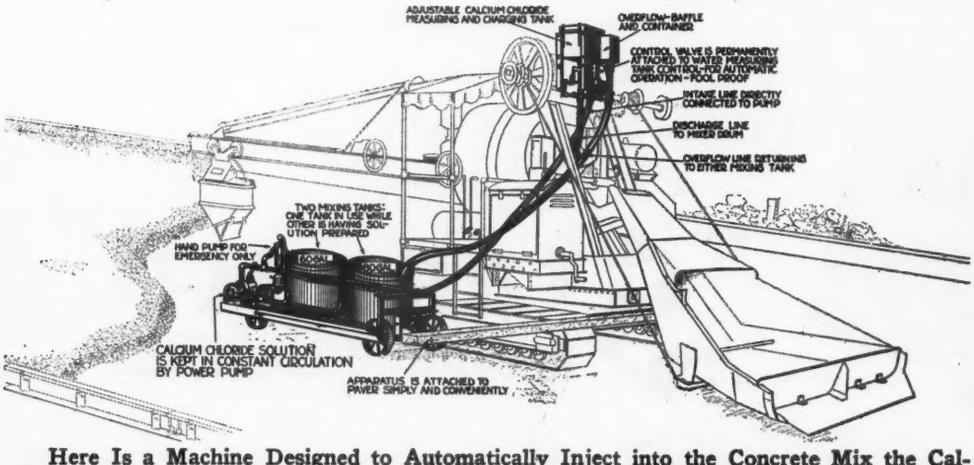
✣

Quick Hardening Concrete

THE purpose of the machine illustrated here is to meet a new specification which has already been issued in several states and which is rapidly being adopted for highway work and all types of general concrete construction. By this specification a definite amount of calcium chloride is required in each batch of concrete to effect proper curing with greater speed and economy, the result being accomplished by the fact that calcium chloride has a natural affinity for water and holds it, giving up the water slowly over a long period of time.

The use of calcium chloride solution in the batch eliminates the lengthy curing processes, such as covering the concrete with straw or earth, ponding or continual wetting. It produces high, early strength in the concrete and pavements laid by this method can be opened to traffic in less time with a reduction of at least 25 per cent in the curing cost.

Automatic regulation and injection of the correct amount of calcium chloride solution into each batch of concrete is accomplished by this mixing, measuring and charging machine. Only one additional man is required to prepare the solution and to handle the bags of calcium chloride. The machine is mounted on four wheels for easy transportation with the work and is attached to the paving mixer, on paving jobs, so as to move with the work.


ADJUSTABLE CALCIUM CHLORIDE MEASURING AND CHARGING TANK
OVERFLOW-BAFFLE AND CONTAINER
CONTROL VALVE IS PERMANENTLY ATTACHED TO WATER MEASURING TANK CONTROL FOR AUTOMATIC OPERATION—FOOL PROOF
INTAKE LINE DIRECTLY CONNECTED TO PUMP
DISCHARGE LINE TO MIXER DRUM
OVERFLOW LINE RETURNING TO EITHER MIXING TANK
TWO MIXING TANKS: ONE TANK IN USE WHILE OTHER IS HAVING SOLUTION PREPARED
HAND PUMP FOR EMERGENCY ONLY
CALCIUM CHLORIDE SOLUTION IS KEPT IN CONSTANT CIRCULATION BY POWER PUMP
APPARATUS IS ATTACHED TO PAVER SIMPLY AND CONVENIENTLY

Here Is a Machine Designed to Automatically Inject into the Concrete Mix the Calcium Chloride Solution Which Is Being More and More Generally Specified to Obtain Quick Hardening Concrete for All Purposes.

Residence of D. R. McEachron, architect, 316 Hobart Street, Grand Rapids, Michigan. Mr. McEachron designed this house himself and used Celotex Insulating Lumber as sheathing under the brick veneer and under the shingles on the second story.

"I have added $500.00 to the value of my home with Celotex"

D. R. McEachron, Grand Rapids, Michigan, architect finds this insulation worth that much in fuel saving alone—to say nothing of comfort. Now you too can increase the value of the houses you build, at little or no extra cost.

WHEN Mr. McEachron designed this home for himself, he knew that a special insulating material was needed back of the brick veneer exterior and under the wood shingles.

He specified Celotex Insulating Lumber because it offers striking advantages found in no other insulation.

"As a result," he says, "a very conservative estimate of the fuel saving this past winter is thirty dollars. This saving capitalized at 6% shows I have added about $500.00 to the value of my home."

Wouldn't advantages like that be of value to you, as a builder? You can secure them with Celotex at little or no extra cost!

Why this insulation costs little or nothing more

Unlike ordinary insulation, Celotex is not an extra item in the building. It is lumber—made from the long tough fibres of cane. It replaces other materials. Celotex is stronger than wood lumber in walls and has many times the insulating value of wood, plaster, brick or concrete.

Mr. McEachron says, "As sheathing, with its many advantages over wood, Celotex did not increase the cost of my house at all."

On inside walls and ceilings, under plaster, Celotex costs a few cents more per yard, but is well worth the difference. It ends lath marks, and reduces cracks.

Moreover, with the proper use of Celotex in the walls, roof and ceilings of a house a smaller, less expensive heating plant and smaller radiators will be required.

Saves labor and material

Celotex is exceptionally economical to apply. The broad strong boards (4′ wide, 8′ to 12′ long, 7/16″ thick) are sawed and nailed just like wood lumber. Light in weight (about 60 lbs. per 100 sq. ft.) they are easily handled. There is less waste in cutting and trimming, because Celotex is all usable lumber, free from cracks, knots and other defects.

Progressive builders and contractors everywhere are using Celotex to help establish their reputations for building modern, comfortable, economical houses. In five years more than 80,000 houses have been built with Celotex.

Ask your architect or lumber dealer more about this remarkable insulation. Leaders in these lines advise its use. All lumber dealers can supply it. And send the coupon below for complete details that show just how Celotex is used and what its great value is to you as a builder.

How Celotex Is Used

On outside walls, as sheathing, it affords insulation and adds many times the structural strength of wood. On inside walls and ceilings, under plaster, it gives a stronger insulated wall with a better bond between Celotex and plaster than the key between wood lath and plaster. It eliminates lath-marks.

THE CELOTEX COMPANY, CHICAGO, ILL.
Mills: New Orleans, La.
Branch Sales Offices in principal cities (See telephone books for addresses)
Canadian Representatives: Alexander Murray & Co., Limited
Montreal, Toronto, Halifax, Winnipeg, Vancouver

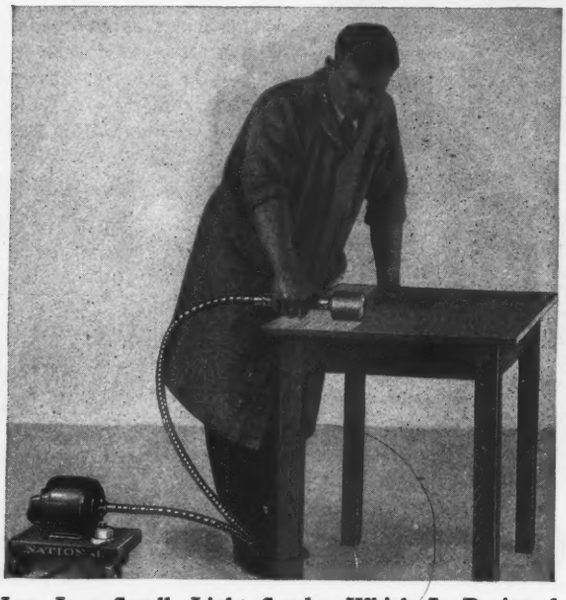
CELOTEX
INSULATING LUMBER

THE CELOTEX COMPANY, Dept. T-148,
645 N. Michigan Ave., Chicago, Ill.
Send the Celotex Building Book and Specification Book, free.

Name .....
Street .....
City ..... State .....
Amer. Bldr.—8-28

A Close-Corner Sander

IN floor sanding the greatest hindrance to quick, high grade work is found in the odd corners which the usual large floor sander will not reach. Floor edges, corners, stair treads, window seats, stair posts and railings must all be



Here Is a Small, Light Sander Which Is Designed to Eliminate All Hand Work on Floors and Interior Woodwork.

finished by hand scraping, which is slow, laborious and expensive work and frequently leaves unsightly marks. This difficulty has been solved by the development of a new small sanding machine which will reach all the odd corners.

This machine consists of a small, high speed sanding drum connected with a flexible drive shaft to an electric motor, which can be operated from any lighting socket. The whole outfit can be carried anywhere and used on parts of the work that cannot be reached by the large machine including everything from floor edges to built-in cabinets and furniture.

A uniform, smooth job, comparable in every way with the best type of large sanders, can be produced by one man as quickly as five or six men could do it by hand. Because of its adaptability even to the finishing up of woodwork and its economy of labor it should prove a money making addition to the equipment of the contractor who does his own sanding.

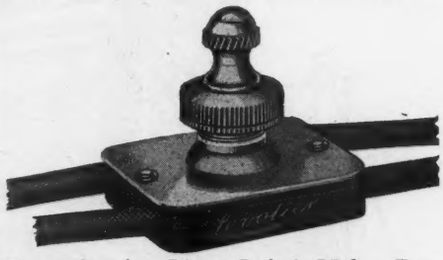
✣

A Dimming Light Switch

A LATE development in the lighting field is a series multiple switch which affords a large measure of economy and lighting satisfaction. In most rooms there are times when bright lights are desired and other times when dimmer, softer lights are to be preferred. Then, too, people often wish to leave a room or even the house with a small amount of light on without wasting the full lighting current. All these things are made possible with the new switch.

This switch is an exceedingly small, shallow fixture making it suitable for installation in almost any desired place, wall brackets, table lamps, floor lamps, chandeliers and the like. A single turn of the knob turns on the lights to their full brightness while a second turn dims them to about one-seventh of the full brightness. When dimmed only about one-third of the full current is used. The resulting light is a soft even glow far superior to the turning off of one or more of the lamps in the fixture, a means which always gives an unsatisfactory and unbalanced effect.

These switches can be used in all fixtures with two lamps or any multiple of two lamps, that is four, six, eight, and so on, but can not be used on one-lamp units. The second or dimming turn of the switch throws pairs of lights into series, thereby diminished the candle power to about one-seventh of its normal volume. This principle avoids all danger of overheating the switch, such as would be involved were there a resistance, and so eliminates the fire hazard. These switches are equipped with 6-inch wire leads so that they need not be taken apart to make connections and they are easily fitted to installations that are already in place.



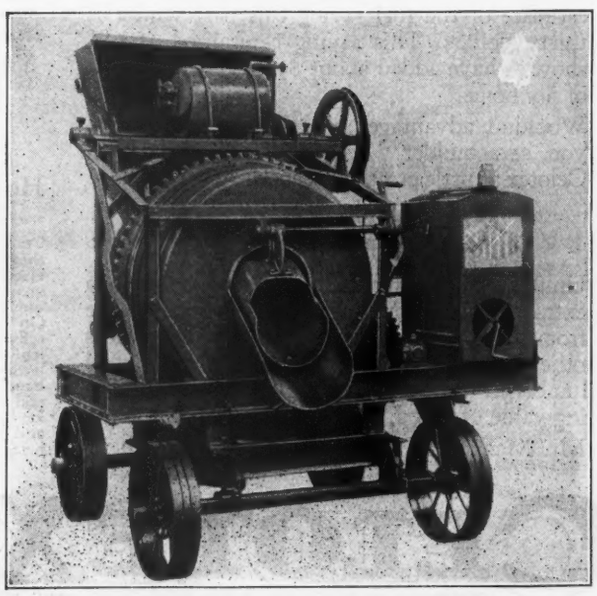
This Dimming Light Switch Makes Possible a Greater Lighting Satisfaction.

✣

End Discharge Concrete Mixer

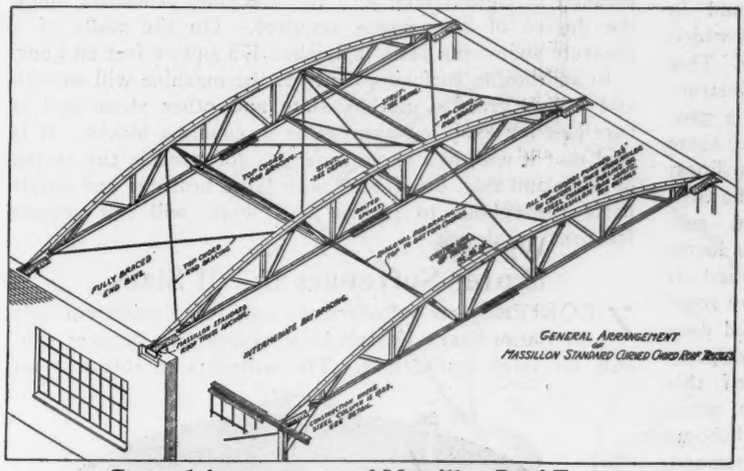
A LEADING manufacturer of concrete mixers and pavers has recently announced that one of its non-tilting type mixers can now be furnished on crosswise trucks for end discharge like a paver. This does not, however, apply to the same mixer in the tilting type. The new arrangement is especially designed for greater utility where the job is strung out as in conduit, sewer, curb and gutter and grouting work, and in sidewalk and alley paving. A big daily output is assured because time and handling is saved by delivering mixed concrete directly to the forms.

Mixers with this equipment are now available at the factory. The standard wheels and axles are removed intact and installed on the crosswise frame. The standard frame is arranged to be bolted onto the new unit. A hauling stub, telescoping under the skip, is used in place of the standard. The stationary spout allows ready placing of the concrete directly into the forms but an 8-foot distributing spout, with a swing of a half circle, can be furnished as an extra. The distributing spout with the two discharge points allows accurate placing of the concrete.

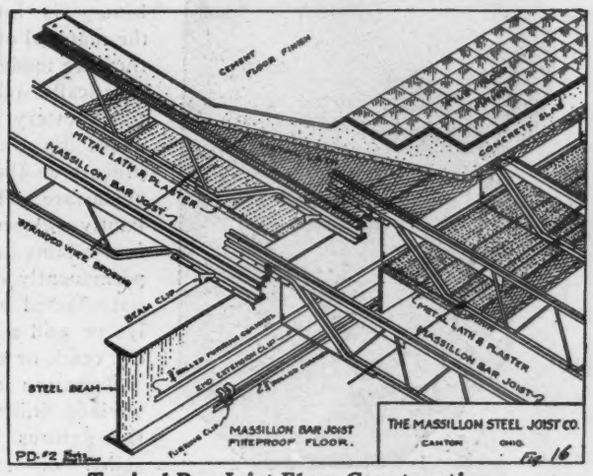


A Non-Tilting Mixer Equipped with Crosswise Trucks for End Discharge, Has Greater Utility on Many Jobs.

MASSILLON BUILDING PRODUCTS



General Arrangement of Massillon Roof Trusses



Typical Bar Joist Floor Construction

The practical economy and high quality of Massillon Bar Joists for Fireproof Floors is changing methods of building construction and has revolutionized the Steel Joist industry.

Other products of the same dependable character have been added to the Massilion Line and each in its field is rapidly taking the lead. Although Massillion materials are extensively used in larger buildings they are equally valuable in smaller installations. Quick delivery from stock, the decided improvement in finished building and the lower final cost recommend the use of these materials.

Bar Joists

For all floor and roof construction—Garage roofs large and small—Porch floors—Residences—Store Buildings—Office Buildings—Apartments—Churches—Warehouses—Schools, etc. Floor finish in wood, tile, terrazzo, cement, etc.

Roof Trusses

A standardized Bow String truss especially adapted to garage roof construction or any place where clear spans are desired.

Vault Reinforcing

A specially designed reinforcing frame which economically secures the maximum protection in vault construction for Banks—Oil Stations—Hotels—Residences.

Metal Lath

A complete line of metal lath—corner beads—base screeds and furring channels.

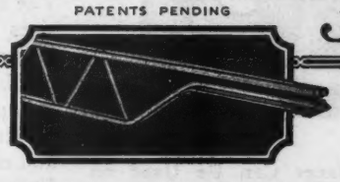
The Massillon Line includes reinforcing steel, fabricated structural steel and miscellaneous iron and steel materials. We maintain a high class engineering organization and will be glad to submit quotations on our materials if you will forward plans or sketches of your proposed building. Special attention is given to small orders.

Descriptive literature will be mailed on request.

We have some good territory open for active dealer connections.

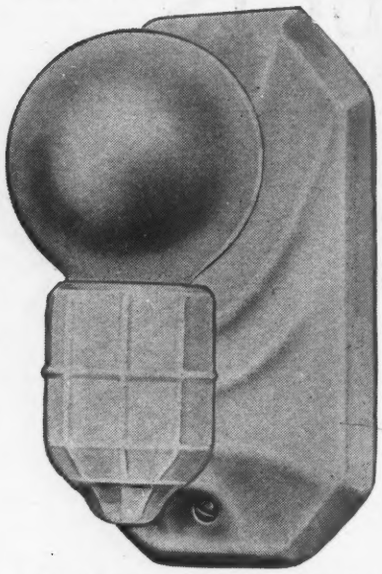
The Massillon Steel Joist Co., 909 Belden Ave., N. E., Canton, Ohio

MASSILLON
BAR JOISTS
PATENTS PENDING



Vitrified Pottery Fixtures

VITRIFIED pottery lighting fixtures will appear as something entirely new to many people though these fixtures have been manufactured and used for many years. Installations as much as 20 years old are said to be just as perfect and beautiful today as when first installed. The reason for this enduring beauty is found in the material of which they are made. This practically indestructible pottery is produced by the same process as the finest chinaware. The brilliantly glazed surface retains its luster permanently and is not affected by soap, lye or acid and does not crack or chip.



Glazed Pottery Lighting Fixtures Are Easily Kept Clean and Are Available in Many Harmonizing Colors.

Because of this vitrified finish, when the fixtures become soiled or steamed, they may be wiped off with a wet or dry cloth, or cleaned with soap and water or even with acid and made as fresh as ever.

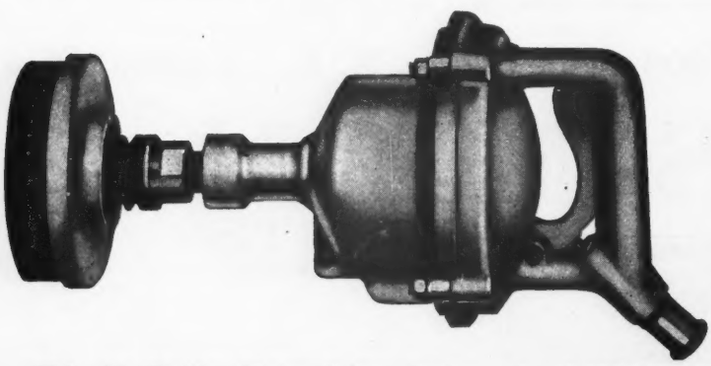
Fixtures of this type are made in the form of bathroom wall brackets and ceiling fixtures, living room, dining room and bedroom wall brackets, portable lamps and commercial and kitchen units. Shades are used with the lamps and with the wall brackets for living rooms, dining rooms and bedrooms. These may be either of silk or glass or any other of the usual shade materials. Only the silk shades, however, are furnished by the manufacturers of the fixtures and these are of the best grade Jap lamp shade silk with lining of the same quality.

The fixtures themselves may be had in a variety of colors to harmonize with any type of decoration or color scheme. Some of these colors are: white, black, blue, old ivory, amber, golden brown, moss green, apple green.

✣

Air Turbine Concrete Surfacer

THE illustration shows a concrete surfacer which weighs only 13 pounds and is driven by an air turbine motor. It is made without reciprocating parts and consequently with no wearing parts. The construction is such that the air consumption never increases, as it does in reciprocating tools and others, by wear. The air required is from 28 to 30 cubic feet a minute at from 80 to 85 pounds pressure.



This Air Turbine Motor Driven Surfacer Can Be Used on Concrete and Also for Polishing Stone Work and Aggregates in Concrete.

These tools are furnished with carborundum stones in coarse, medium and fine grades enabling the operator to secure any desired finish. Cash iron scroll wheels, for knocking off rough parts, can be furnished if desired. With each machine an emery dresser, designed to attach to the machine and true up the stones without removing them, is furnished.

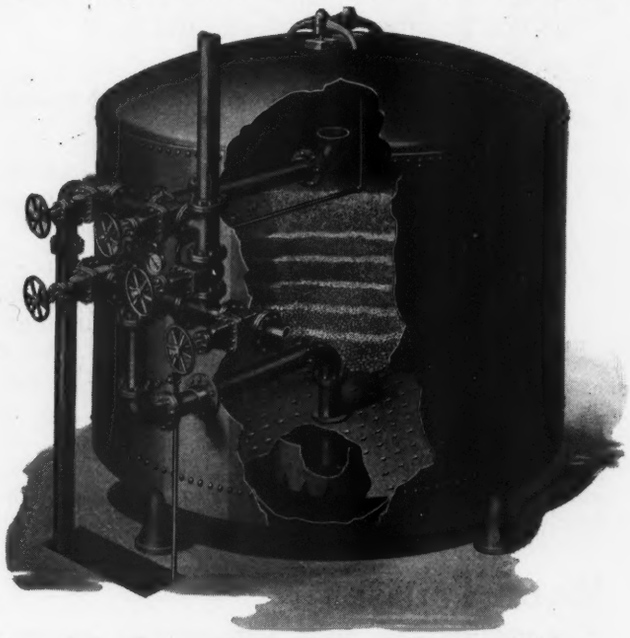
It is stated that careful records kept of work actually done show that from 500 to 2,000 feet of concrete can be finished in eight hours with the machine, depending upon the degree of smoothness required. On the walls of a concrete swimming pool, it finished 175 square feet an hour.

In addition to surfacing concrete the machine will smooth and polish granite, marble, slate and other stone and is excellent for exposing aggregates in concrete blocks. It is said that it will, in a short time, pay for itself in the saving of labor and that, being built with large bearings and ample parts throughout to insure long wear, will not require frequent repairs.

✣

Water Softeners in All Sizes

ZEOLITE water softeners are now being made not only in the ordinary household sizes but also in sizes suitable for large institutions. The softeners in this line are constructed on the same general principle. The water is passed through the zeolite, insoluble hydrated silicate of aluminum combined with alkali or an alkaline metal or both. This zeolite has the property of exchanging the soda which it contains for the hardening salts in the water.

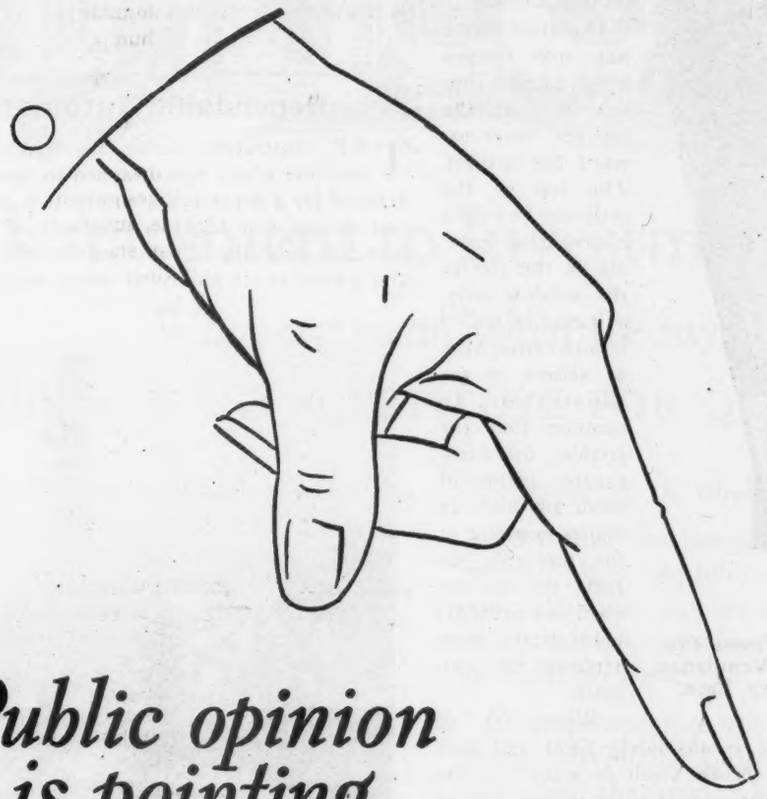


One of the Larger Zeolite Water Softeners Which Are Being Made in Sizes Suitable for All Large Institutions.

After being used till the soda content is exhausted, it is renewed by the use of common salt from which it takes sodium in exchange for the salts previously absorbed, and the salts are washed away with clean water. This process may be repeated indefinitely.

A great part of the success of this particular line of softeners is attributed to the strainer plate method of collecting the softened water which is used in all sizes. The softeners are of the pressure filter type. The shells are of high grade, mild, plate steel and all sizes up to 56 inches are welded throughout. The larger sizes are riveted and caulked throughout. Shells are made for various working pressures providing a factor of safety as required by the underwriters for pressure vessels located within buildings and each softener is subjected to a hydrostatic test of 50 per cent greater than maximum safe working pressure before leaving the shop.

JOHNS-MANVILLE
Asbestos Shingles



Public opinion is pointing –towards FIRESAFE roofs

PEOPLE no longer buy a roof as casually as they used to. Greater and greater grows their demand for fire-safety and as it grows the use of asbestos shingles increases.

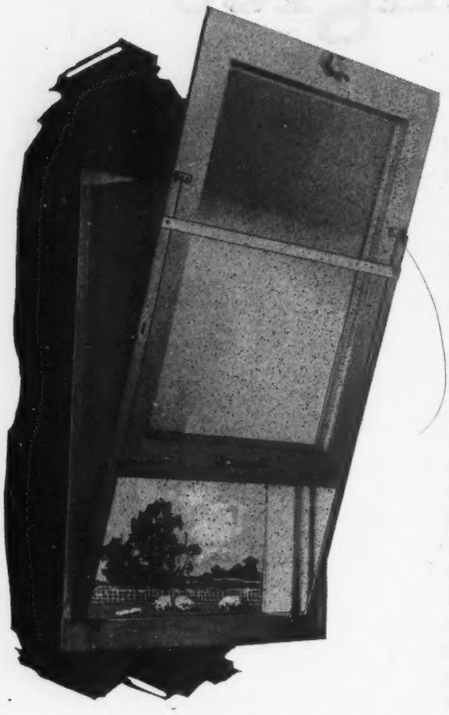
Dealers now find asbestos shingles easier than ever to sell, and the speculative builder has discovered them a big sales asset.

JOHNS-MANVILLE Inc.
292 Madison Avenue, at 41st Street, New York City
Branches in all large cities
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

Asbestos
and its allied products
INSULATION
BRAKE LININGS
ROOFINGS
PACKINGS
CEMENTS
FIRE PREVENTION PRODUCTS

Steel Ventilating Windows

PROPER ventilation for the dairy barn is a highly important consideration as plenty of good fresh air must be provided at all times without allowing direct cold drafts to blow on the animals. A new all-steel ventilating window meets these requirements for barns which are constructed of any type of masonry, hollow tile, brick, concrete, stone, or cement block.



This Steel Window and Frame Provide for the Right Type of Ventilation Essential to the Good Dairy Barn.

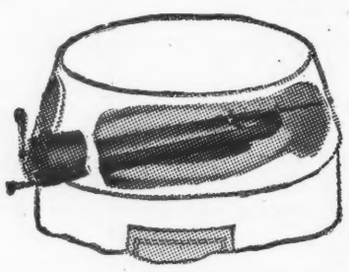
The steel frame has side flanges which project into the barn at the top and taper toward the bottom. The top of the sash may be pulled in giving an opening at the top of the window only, or it may be pulled in and raised also, as shown in the illustration. In summer time the double opening assures plenty of fresh air while in winter opening at the top only directs the air upward and prevents cold drafts from striking the animals.

When set all around in mortar the frame is absolutely tight and permanently set and will not shrink, swell or warp because it is all steel. The sash has overlapping metal on all four sides making it practically air tight. A hand pull at the bottom assists in opening and a pressure latch at the top assures the air-tight fit. Both frame and sash are galvanized and then finished with a satin aluminum finish which is permanent and not affected by any weather conditions. No putty is required for glazing so that the glass cannot loosen and the glazing is a heavy 3/16-inch glass which is not easily broken.

✣

Warm Air Humidifier

PROPER humidity in the air of the home will improve the living conditions to a remarkable extent for it not only affords a soft balmy air to breathe but protects the health of the family by eliminating most of the colds and similar sickness of the winter months. In addition it saves the furniture, piano, paintings and woodwork from damage from excessive dryness and effects a large saving in fuel as moist air is comfortable at a temperature several degrees lower than that required for comfort with the dry air usually found in the home.



This Automatic Humidifier Can Be Used on Any Style of Warm Air Furnace.

The warm air moistener illustrated is an automatic humidifying machine which will furnish exactly the right amount of moisture necessary. It can be placed on any style of furnace and does not change the piping system nor alter the furnace in any way. It does not interfere with the circulation of air. The machine itself is simple, having no springs, gaskets or intricate parts to get out of order. It connects directly with the city water system and takes care of itself automatically. The amount of moisture furnished is governed by the amount of water fed into the evaporator and can be adjusted for any amount necessary to maintain the relative humidity.

✣

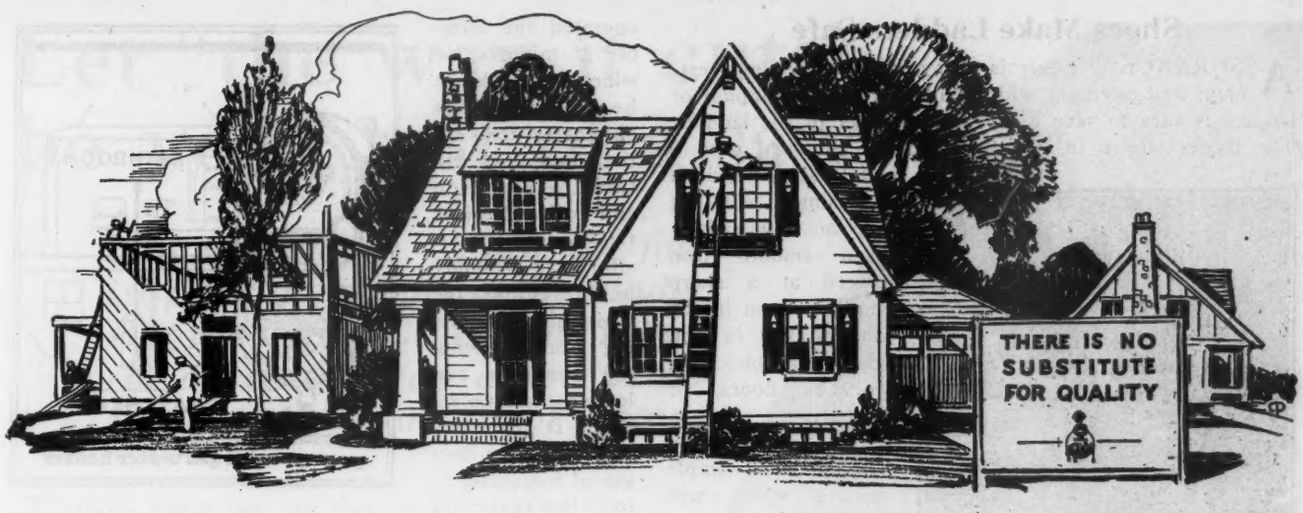
Dependable Automotive Hoist

THE illustration shows the application of a hoisting machine which was designed to meet the ever increasing demand for a dependable, automotive, hoisting engine. Correct design and highest standards of material and workmanship, add the distinct advantage of combined speed and power to its ability to move itself from place to place with minimum effort. It is particularly adapted to construction work of all kinds.

An Automotive Hoisting Engine Is in Use Here and It Has Given Great Satisfaction Because of Its Speed and Mobility.

The hoist is attached to the tractor by means of reinforced channel iron members bolted rigidly to the ends of the radiator bottom tank, which replaces the regular tank, and to machined steel brackets bolted to the flange of the transmission housing. It is chain driven from the power take-off and the regular power pulley may be used though the use of clutch pulleys is recommended or special two speed take-off or special reversible power take-off.

Operation is fully controlled from the driver's seat and the hoisting cables may lead off at practically any angle without interference. This feature is especially valuable in building construction. This hoist has a guaranteed hoisting capacity or direct line pull of 5,000 pounds off the main drum and 4,000 pounds off the upper drum of the double drum type, and hoisting or line speeds of 10 to 500 feet per minute. With the standard ratio drive, this hoist develops a maximum pull of 4,000 pounds off the main drum at a line speed of 150 feet per minute. Any combination of line speed and line pull may be had by lagging the drum barrels or by means of special drive sprockets.



A frank statement to Investment Builders

What we mean when we say:

"THERE IS NO SUBSTITUTE FOR QUALITY"

There are two general classifications of investment builders:

1. The builder who uses cheap materials, cheap labor, and shoddy construction; the man who builds houses as cheaply as possible with no further thought than to sell them for as great a profit as possible.

2. The builder who uses only the best materials (usually nationally advertised goods), employs the best and most durable methods of construction, and who realizes that *reputation* means the *most* profit.

Frankly, the first classification will not be interested in what we have to say.

To you of the second class—the "reputation" class—we offer you nationally recognized paints and varnishes, backed by over a half-century of recognized leadership as manufacturers.

Your prospective customers know the Sherwin-Williams *Cover-the-earth* trade-mark, and that it stands for quality. You put this trade-mark to work for you when you finish a house with Sherwin-Williams products—and in so doing you imply the same high quality in the other materials entering into the construction.

Sherwin-Williams finishes on your houses give you a persuasive sales argument.

The S-W Architects' Painting Guide

We have prepared the S-W Architects' Painting Guide which will assist you in selecting the right working and long-lasting finish for each surface —varnish, enamel, wall paints, floor paints, exterior paints. The coupon will bring a copy by return mail.

SHERWIN-WILLIAMS

PAINTS, VARNISHES COVER THE EARTH *AND LACQUERS*

Sherwin-Williams Co., 407 Canal Road, Cleveland, Ohio

Send me copy of Architects' Painting Guide.
Send me your specification sheet. I am building .....(fill in kind of buildings) and would like to receive suggestions from your Decorative Studios. No obligation.

Name.....

Street.....*Place*.....

NOTE: *Free Decorative Studio Service*

Experienced decorators will sketch and recommend decorative schemes for interiors or exteriors of your buildings.

There is no red tape attached to this offer.

When offering houses for sale, make capital of the fact that the decorations were designed by experts. The coupon will bring specification sheets.

Shoes Make Ladders Safe

ASSURANCE of safety is always a worth while investment and anything which will prevent the slipping of ladders is sure to save money for the user of the ladders. The ladder shown in the illustration is equipped with a safety shoe which, it is claimed, will not slip on any surface, even smooth iron placed at a sharp angle as seen in the illustration, or on glass, marble, ice, polished floors, or asphalt.

Equipped With These Safety Shoes Ladders Can Not Slip on Any Surface Though Placed at a Sharp Angle.

This safety shoe consists of a simple casting which will last indefinitely and a rubber pad which can be renewed whenever necessary at a small cost. The shoe can advantageously be fitted to both the feet and tops of all ladders and the increased feeling of security which it affords will speed up all kinds of ladder work.

✣

New Bell Ringing Transformer

A NEW bell ringing transformer, designed for residences and small apartments, has recently been placed on the market. It is enclosed in a steel case 2¾ inches long, 2¼ inches wide and 1½ inches high. It has a capacity of 25 watts, primary 110 volts and secondary 8 volts. The terminals are 10 inches long making a generous allowance for installation. The primary leads are distinctly marked wires, one white wire and one black. They are securely anchored in the transformer and cannot be pulled out with ordinary usage. The secondary terminals are so made that the screws cannot be backed off.

The transformers are made to lie flat against the wall and the design permits mounting in boxes and saves considerable time in installing. They are made in both single-circuit secondary and three-circuit secondary types. The single-circuit type delivers 8 volts on the secondary side and the three-circuit type delivers 6, 12 or 18 volts by installing according to directions.

An Easily Installed Bell Ringing Transformer for Residences.

✣

Gas Water Heater Control

REGULATION of the gas hot water heater by means of the automatic device illustrated should prove a decided convenience to every householder as well as an assurance of safety. This appliance consists of a clock-contained unit which can be installed on the wall of the bathroom or kitchen, or both, and is connected with a safety pilot, on the heater, by a flexible cable. When hot water is wanted for kitchen, bathroom or laundry the clock is set and the heater is lighted by a turn of the lighter.

The clock automatically shuts off the heater after it has operated the number of minutes for which the clock has been set. This eliminates trips to the basement to turn the heater on and off. Besides this convenience it affords an economy in preventing the waste of gas resulting from allowing the heater to run longer than necessary. It eliminates worry and the danger of forgetting to turn the heater off as it never fails to turn the heater off at the proper time.

Here Is a Clock Operated Control for Gas Water Heaters Which Can Always Be Depended Upon.

The appliance is simple in construction so that it is dependable and also can be manufactured to sell at a price every home owner can afford. It can be used with all makes of gas water heaters either on new installations or those already in use.

✣

Self Holding Tee Square

A MAGNETIC tee square that holds itself, thus acting as a "third hand" for the draftsman, recently has been placed on the market. It can be used on any standard drawing board without need for clamps, wires, springs or pulleys and, because of its simplicity, saves time and assures accuracy. It is identical with the ordinary tee square except that, in place of the ebony edge to the head, it is provided with a special stainless steel, magnetic, working edge on the head.

With it is supplied a nickeled steel working edge for the drawing board which can be easily and quickly attached to any board. In use the magnetic head holds the tee square snugly against the edge of the board leaving both hands free for instrument work. It may be removed from the board like an ordinary tee square. The magnet is guaranteed for 20 years.—R. G. THACKWELL.

The Magnetic Head on This "Tee" Square Holds It Firmly Against the Drawing Board Leaving the Hands Entirely Free Thus Earning the Right to Be Described as a Third Hand.

Let "the way it cuts" be your test of a saw

Not the shape . . . nor the finish; nor the spring in the blade. But the way it CUTS, and keeps on cutting, year after year. Let that be your test of a saw.

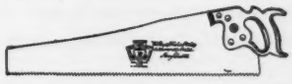
THINK about this saw question. You spend many hours each working day with a saw. You must have a saw that cuts. There is no way to test a saw in a hardware store that will prove it will last twenty years or three weeks.

Except this! You can look for a name that has stood every test of carpentry for 86 years.

Henry Disston knew what a saw must do for carpenters. He worked out his own steel to make such a saw.

. . . . balanced it to move naturally with your arm, tempered and tensioned it to give spring and life to the blade. Tapered it for free clearance in the cut.

So—decide on a Disston. Then think about shape, about temper and finish.



Here's the D-8 skew back saw, wide blade, favorite of carpenters for two generations.

Or you may want a lighter saw—a narrower blade.

Try the D-20 skew back saw, Or the D-23 if you like a straight back.

But if you want the finest of all saws, ask your hardware man to

show you the Disston D-115 saw.

Pick your shape. Disston makes them all. Suit yourself as to hang and balance. But be sure it's a Disston Saw.

Henry Disston & Sons, Inc.

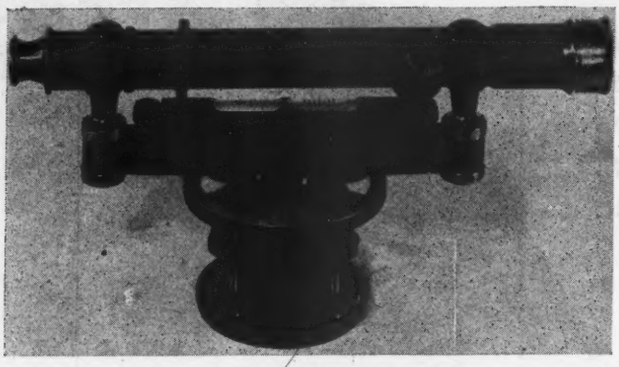
Makers of "The Saw Most Carpenters Use"

Philadelphia, U. S. A.

DISSTON

Builder's Level Improved

A WELL known builders' dumpy level has just been remodeled with decided improvement to meet the demands of contractors and builders. This level is designed to make an instrument of the greatest possible durability and sturdiness and one which could be quickly leveled and



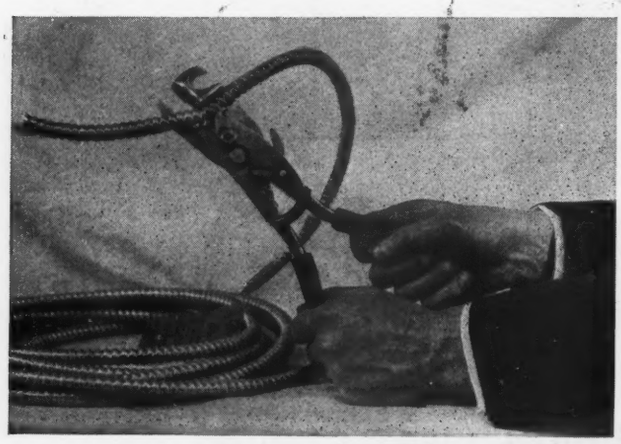
Here Is an Improved and Guaranteed Dumpy Level Designed for the Builder.

hold its adjustment. The product is guaranteed to have the best material and workmanship and to prove absolutely satisfactory. The telescope is 12 inches long with a magnifying power of 24 diameters and an objective of 1⅛ inches. The specifications include: rack and pinion movement to objective, adjustable eyepiece for focusing cross hairs, fine bubble, 6-inch vial graduated on the glass, horizontal circle 3½ inches in diameter graduated to degrees and reading by Vernier to five minutes, friction clutch to hold circle, clamp to telescope bar, four leveling arms. It comes complete in a mahogany box with plumb bob, adjusting pins, metal trivet and tripod.

✣

Efficient Cutting Tool

CUTTING the steel tape of armored cable, without piercing the insulation, has always been a task requiring considerable skill. Recently, however, a tool has been invented and placed on the market which does this work quickly and easily without the least danger of piercing the insulation and which requires no particular skill in its



Using This Tool the Steel Covering of Armored Cable Can Be Readily Cut Without Piercing the Insulation.

use. This tool, which is shown in the illustration, can also be used to serve in the place of cutting and bending pliers and as ordinary gas pliers.—R. G. THACKWELL.

✣

New Stucco Paint Perfected

MANY new and unusually beautiful architectural effects have been made possible by the use of stucco but when these artistic effects become streaked and weather-stained nothing presents a more unsightly appearance. Many attempts have been made to formulate a successful paint for refinishing stucco but oil paints do not serve this purpose and a special cement paint is required. Such a paint has been perfected which bonds with the material to which it is applied and becomes an inseparable part of it, refusing to chip, crack or peel.

This new stucco paint comes in 16 popular tints and also in white, and these colors are described as absolutely permanent. It comes in a powdered form and is mixed with cold water. It is then applied with a large white-wash brush or, better yet, with a spray paint machine.

This paint cannot be used for general purposes as it adheres only to surfaces with which it will bond. Because of this fact it is not necessary to protect woodwork and windows when spraying as they may be readily washed clean with a sponge after the job is finished.

✣

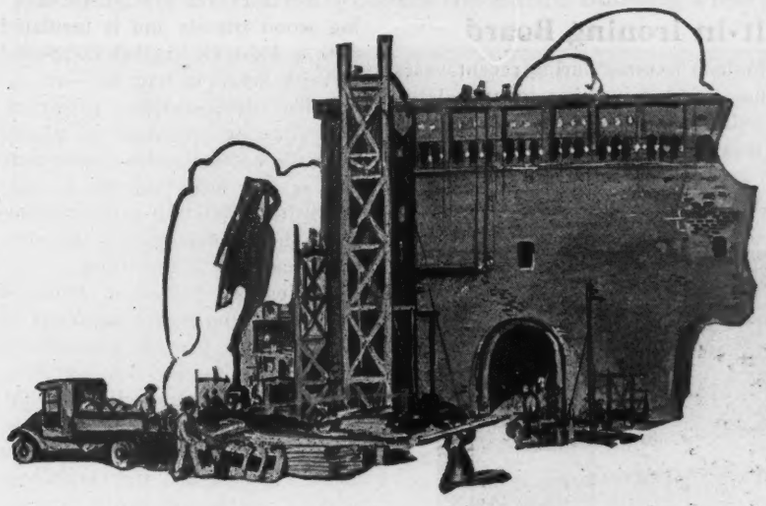
New Type Asbestos Shingle

A NEW design of asbestos shingle was announced, not long ago, which makes possible new and interesting architectural effects. This shingle measures 12 by 24 inches and is laid horizontally, in courses parallel to the eaves. A 3½-inch side lap and a 3-inch head lap are used, with an exposure of 9 by 20½ inches. A copper hook is nailed into the sheathing beneath the shingle it supports and at the joint in the course below. This hook holds the lower edge of the shingle down in place.

The joints are broken in each course and staggered 3½ inches to the right or left, avoiding straight lines in the roof. In laying the first course the side lap must be measured but for all succeeding courses no measuring is required as the shingles are butted against the sides of the shingles in the course below.

Each shingle casts a heavy shadow, as so much desired by architects, and five colors are available to use separately or blended. These colors are: Colonial gray, Indian red, quarry blue, autumn brown, and copper green. The new shingle is almost as low in price as the popular hexagonal type and the method of laying reduces the labor cost to a material extent because there are fewer shingles to apply and the self-aligning feature facilitates application.

These New Asbestos Shingles Are Laid Horizontally Giving an Attractive Effect and Deep Shadows.



JAMES LECK made a record on the U. of M. Stadium!

THE University of Minnesota Memorial Stadium was let to the James Leck Company on a time contract. It had to be ready for the big games. The Leck Company more than met the seating capacity called for at the first game, thus preventing a heavy penalty.

As their letter at the left indicates, the Leck Company attributes the speed on the job largely to the use of Carney for the mortar. There was no time lost soaking, slaking and adding lime. Carney came ready to use. Its extreme plasticity and fineness made possible instant mixing with water and sand.

Besides, Carney is slow to set before going into the wall, thus overcoming the need of tamping and tempering on the boards by the masons. This means a marked increase in the number of bricks each man can lay in a day—it saves time and it saves money.

If you want to see the lowest mortar and masonry cost you have ever had, put Carney on your next job.

"The specifications for the U. of M. Memorial Stadium which was erected by us last year, permitted the contractor to choose between Carney's cement and Portland cement and lime for the mortar for all brick and tile work.

After careful analysis and comparison of costs, we decided in favor of Carney. Our cost records indicate that this decision was a wise one and we believe that its use on this job, to a great extent, assisted us in making the speed record which we established on it.

Owing to the uniformity of color and consistency of the mortar, the general appearance of the face brick work on the Stadium is very pleasing and we ascribe in no small measure the accomplishment of this result to the use of Carney's cement."

C. T. NAUGLE, Treasurer,
JAMES LECK COMPANY,
Minneapolis, Minn.

THE CARNEY COMPANY

District Sales Offices: Cleveland, Chicago, Detroit, St. Louis and Minneapolis.

Specifications:
1 part CARNEY
to 4 parts sand.

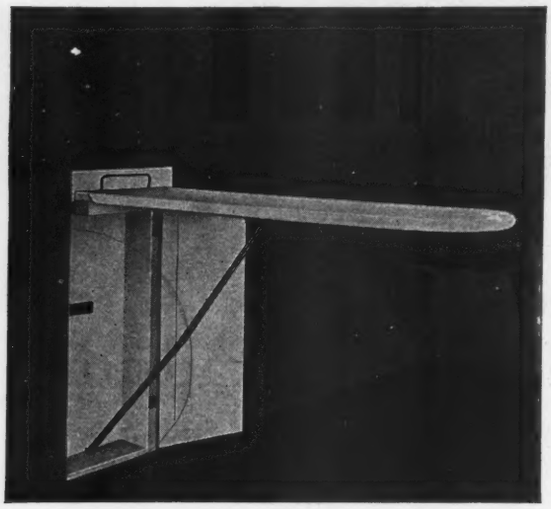
Cement Makers

Since 1883

CARNEY
for Brick and Tile Mortar

Folding Built-in Ironing Board

THE development of built-in fixtures during recent years has been so rapid and so extensive that today a large portion of the home furnishings, especially those which are only periodically used, may be tucked away behind neat wall doors. Here they are out of sight and out of the way but always ready at hand when needed. The space



This Built-In Ironing Board Is Remarkably Compact Because of the Fact that It Folds into Half the Ordinary Space.

occupied by such fixtures is small, frequently only the space between studs which ordinarily is waste space at best.

One of the most compact of these built-in wall fixtures is an ironing board which possesses the additional advantage of folding into half the ordinary length. This board, in its several forms will fit any wall with regular 4-inch studs, under standard height windows, under the counter shelf of kitchen cupboards, under sink case top, in the face of cupboards replacing the door and permitting the use of the space behind or hinged to swing back inside cupboards. The rough opening required is 14 or 15 inches by 32¼ or 33½ inches, according to the type of installation.

All the models fold up with the ironing pad on, this being made possible by a specially constructed hinge, and give a smooth flush ironing surface. To close the board it is only necessary to fold the outer flap back, which releases the brace lock, touch the brace with the toe and the board drops gently into its case.

✣

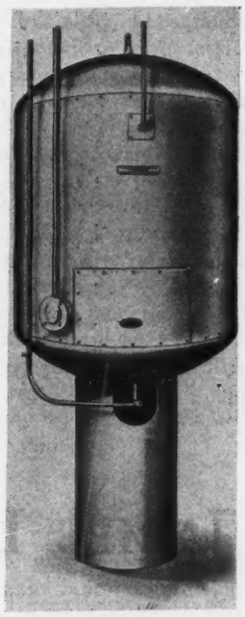
Novel Electric Water Heater

A NEW form of domestic water heater has been perfected and is now ready for the market, which uses the principle of the thermos bottle to prevent heat loss. This is possible because of the electrical heating element, thermostatically operated. There being no fuel or flame necessary to the electrically generated heat, air inlets or exhaust vents are unnecessary and the heating element is completely surrounded by water, to which it gives up all of its heat.

A thermostat automatically regulates the flow of current, turning it off when the water reaches the desired temperature and on when the heat of the water drops below the set point. In this way only a small amount of electricity is used, spread over a long period of hours, thus earning a low rate from the service company supplying the current. When in operation, the device is said to use no more current than an electric iron.

The inner tank itself is supported on non-heat-conducting wood tripods and is insulated with a 4½-inch blanket composed of thick layers of hair felt—an unequaled temperature preserver. The heating element is placed near the bottom of the inside tank and is just large enough to heat the water gradually without creating a heavy demand on the electrical current at any time.

Baffles are placed in front of both inlet and outlet openings to the tank, to prevent currents of water, entering and leaving, mixing the cold water with the hot. This is said to greatly increase the tank capacity. This electric water heater is designed for continuous service and is supplied in several sizes, from 25 to 75 gallons, to meet varying home needs. It is said to operate perfectly in connection with water softeners or with other household water heating devices.



An Electric Water Heater Which Uses the Principle of the Thermos Bottle.

✣

Motor Driven Hoist Trolley

A NEW motor driven trolley has been developed for use with a line of half ton and one ton electric hoists which have before been built in bolt suspension and plain trolley types only. This trolley can be supplied with a travel speed of 80 to 120 feet a minute, so that the trolley and hoist provide an inexpensive, overhead system for handling loads of one ton or less at high speed, both in lifting and moving.

Accurate control makes this equipment very efficient in spotting work for machine tool operations and it can be arranged for remote control if desired. Any hoist of the type with which this trolley is designed for use, can be easily converted into a motor trolley hoist by adding the new trolley. Only 22-inch head room is required for hoist and trolley which is very small for a motor trolley hoist.

The trolley is ruggedly built and maximum traction is obtained by driving all four wheels. The three main castings, from which the hoist and load are suspended, are of cast steel. The spur gear drive is totally enclosed and runs in an oil bath. Hyatt roller bearings are used on all shafts. The motor also is totally enclosed and has high grade ball bearings. All parts are completely assessible and the motor can be removed readily when necessary. It is furnished for direct or alternate current in either two or three phase.

A Trolley Hoist Which Is Very Efficient in Spotting Work Because of Its Accurate Control.

RADIATOR WARMTH

Makes houses sell easier

Everywhere everybody knows that the house equipped with radiators is the house that will be comfortable.

And everywhere builders have found that prospects are easily turned into buyers when they know that the home they are purchasing is going to be warm and cozy, no matter what the weather.

That is why radiator warmth is one of the best salesmen you can employ.

Makes houses sell for more

"Radiator warmth adds from three to five times its cost to the selling price of any home," so says one of the most successful sellers of homes in the country. And builders who realize this important fact are not only selling their houses easier, but are actually making money on every sale.

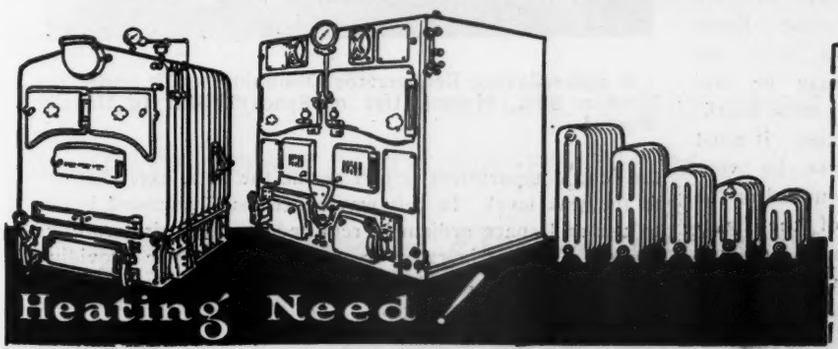
There is an Ideal Boiler for every kind and size of building.

The coupon below will bring you a booklet which tells the whole story.

AMERICAN RADIATOR COMPANY

Showrooms and sales offices: New York, Boston, Providence, New Haven, Newark, Philadelphia, Baltimore, Washington, Richmond, Buffalo, Pittsburgh, Cleveland, Detroit, Cincinnati, Atlanta, Chicago, Milwaukee, Indianapolis, St. Louis, St. Paul, Minneapolis, Omaha, Kansas City, Denver, San Francisco, Los Angeles, Seattle, Toronto, London, Paris, Milan, Brussels, Berlin

Makers of IDEAL BOILERS *and* AMERICAN RADIATORS *and other products for heating, ventilating and refrigeration*



AMERICAN RADIATOR COMPANY
Direct Mail Advertising Dept. 125
1807 Elmwood Ave., Buffalo, N.Y.

GENTLEMEN: Please send me a copy of your booklet, "Ideal Warmth and Comfort."

Yours very truly,

*Name*_____

*Address*_____

*City*_____ *State*_____

A Simple Calculating Device

A CALCULATOR, which weighs only four ounces and can be carried in the vest pocket, but which is equivalent, in service, to a slide rule 66 inches long, and is said to have greater accuracy, has been developed and marketed by an English firm. It will solve all mathematical problems that can be solved with an ordinary slide rule and is so simply operated that it requires no special instruction for users of slide rules to become proficient in its use. Special models are designed to meet special requirements. — R. G. THACKWELL.

This Simple Device Replaces the Slide Rule for Solving Mathematical Problems.

✣

Lightning Protection

THE long discredited lightning rod is at last coming back into its own. Scientists and engineers have made a study of the action of lightning and have proven beyond doubt that properly installed lightning rods are a very real protection to houses. With several thousand farm buildings alone destroyed by lightning each year such protection, costing only one to two per cent of the cost of the building, is certainly worth providing.

The lightning rod shown in the illustration is especially designed for use on slate or tile roofs that carry a ridge roll. It is substantial and quickly put on and there is only one point to watch in the installing. The ends of the rod must be inserted under the tile or ridge roll an equal distance so that they center on top when bent and brought around the roll.

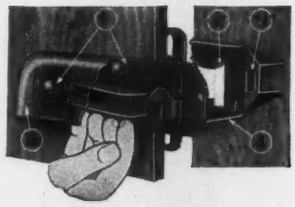
Lightning Protection Is Easily Provided on Tile Roofs with This Type of Rod Fitting the Ridge Roll.

It is also important, in order to work quickly, to measure from the center of the ridge roll to the bottom of the tile and mark both parts so that they will come up to the proper point. From ridge to eaves the cable may be laid loose or with brackets or clips. It must of course be very well grounded or the value of the lightning rod is not only lost but it actually becomes a danger.

A Better Door Latch

A DISTINCTIVE addition to the hardware field is a new door latch adapted to use on garage, barn, crib, granary and silo doors and on gates, for all of which purposes a single size of latch will meet the need. This new latch combines a number of distinctive features which have been incorporated as a result of studying the requirements of men in all parts of the country.

The latch can be adjusted to take care of door shrinkage and is provided with a guide plate which makes it practical for use with either right or left swinging or sliding doors. It is designed for use with a padlock and is so constructed that when locked the screws are covered by the latch and cannot be removed without unlocking the padlock.



A New Door Latch Combining a Number of Distinctive Features Which Make a Better All-Around Latch.

This latch plate takes all of the weight off the latch so that the catch can be easily operated with a light touch from either the inside or outside. This also helps guide a sagging door into place. Over the latch there is a cover plate which serves as a pull for opening the door and also protects the latch from rain, snow and sleet and makes it impossible for any animal to nose open the latch. There are no projections to catch on harness or clothing or injure an animal passing through the door. It is adjustable to all thicknesses of door or gate.

✣

Space Saving Refrigerator

STILL another space saving piece of equipment for the modern small kitchen has been designed in the form of a refrigerator to occupy the space under the kitchen sink. As may be seen from the accompanying picture the icing portion of this refrigerator sits under the sink while

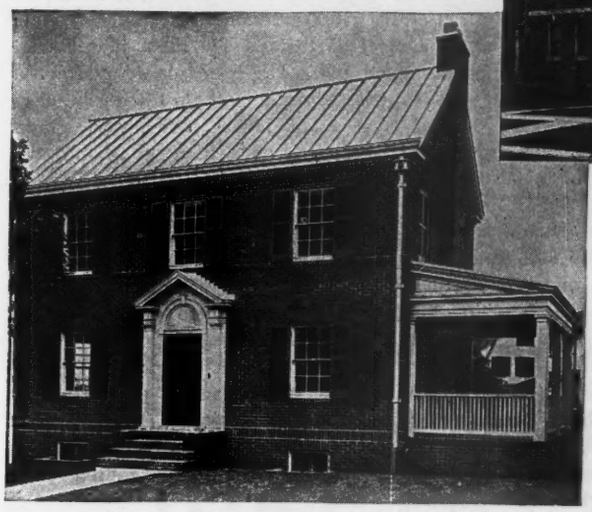
A Space-Saving Refrigerator Designing to Fit under the Kitchen Sink, Making Use of Space Which Is Usually Wasted.

the food compartment is just beside the sink, extending up to the sink level. In this way space usually wasted is put to use and space ordinarily required for the refrigerator is saved. This refrigerator is of the electric type providing dry refrigeration at all times and also providing ice when desired.—R. G. THACKWELL.

HORSE HEAD ZINC *The Permanent, Economical Metal*

New Jersey zinc

West Residence Hall, University of Illinois. Standing Seam roofing and sheet metal work of Horse Head Zinc.



Home of Mr. William F. Zeller, Baltimore, Md. Batten Seam Horse Head Zinc roofing and Horse Head Zinc leaders and gutters.

Standing Seam Horse Head Zinc Roofing is shipped in casks complete with nails, Zinc for clips, and full instructions. Each cask contains enough zinc to cover one roofing square (one hundred square feet) with full allowances for seams and laps.

Horse Head Zinc gives you permanent, stainless sheet metal work at the lowest possible cost.

To every builder this is a message of economy in construction and satisfaction in results. Horse Head Zinc is the logical metal to use for sheet metal work on homes of all types and on larger buildings. The two photographs shown here are Horse Head Zinc installations throughout—leaders, gutters, flashings, valleys and roofing.

Horse Head Zinc cannot rust. It will last a lifetime without repair. Figured on a basis of first cost or cost per year Horse Head Zinc gives service which cannot be matched by any other metal.

Write to us for specific information about your own particular problems.

The New Jersey Zinc Company

160 Front Street • • New York City

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET, NEW YORK CITY

Send me a copy of "Once in a Lifetime," your new free booklet on Horse Head Zinc for sheet metal work and roofing.

MR. _____

ADDRESS _____

8-AB

Uniform Concrete is Produced By Control of Proportions

RECENT experiment and experience has demonstrated beyond any doubt the importance of accurate proportioning of aggregates, cement and water used in concrete. Concrete of uniform quality and strength can be obtained only by the exact control of proportions. Along with the determination of the principles of control, there have been developed methods and equipment for control which are bringing about a new era in the handling of poured concrete.

There are three accepted methods of proportioning, measuring by volume, by weight and inundation. Each of these has been provided for in the equipment which is now available so that uniform accuracy is obtained through mechanical and automatic devices. The labor of from three to 20 men is saved and in most instances the entire operation is controlled by one man. The time required for measurement is considerably reduced, to a point where it is less than the time of mixing, and there is no hold-up of the mixer production.

Many specifications now demand accurate measurement by volume with an automatic strike-off system to eliminate the variability of the operator. But even where such methods are not required they will prove profitable because of eliminating the wastefulness of wheelbarrow methods, the excess of labor which they require and the resulting overrun in cement. This modern equipment consists of a steel batcher which is charged directly, by gravity, from the storage bin.

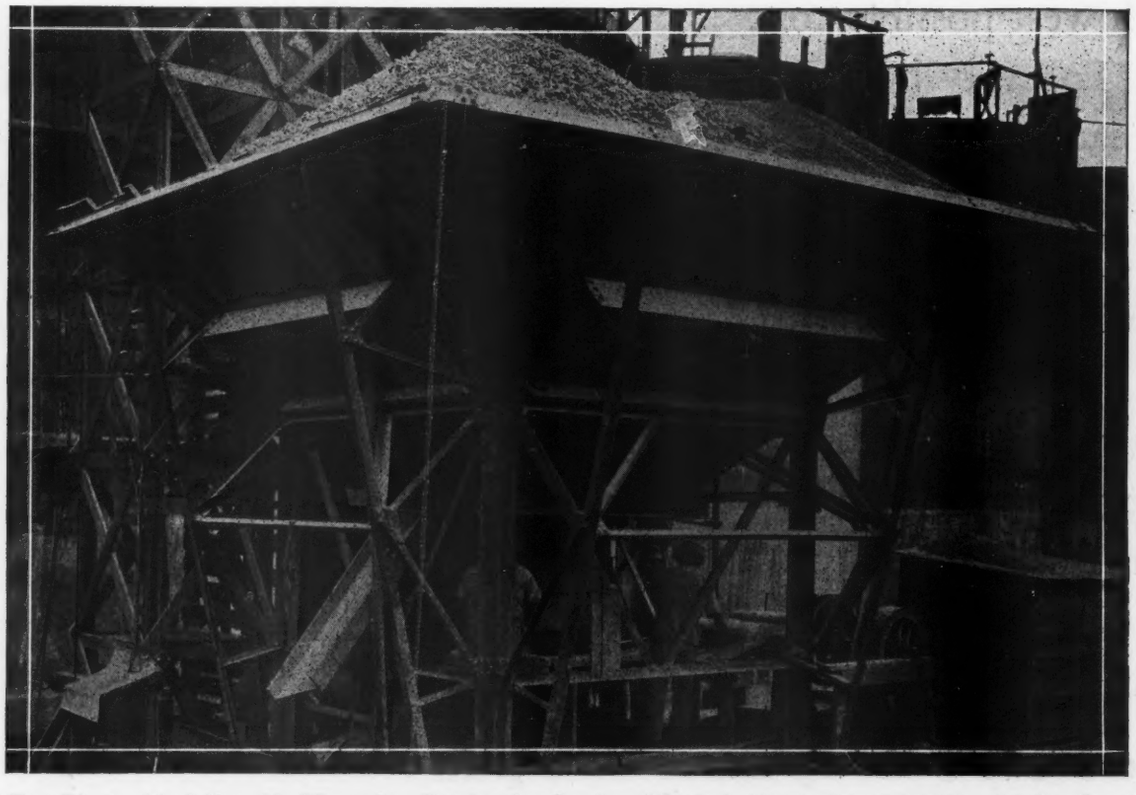
These batchers are adjustable to the desired capacity and adapted to one man operation. They are equipped with automatic strike-off gates which strike off the material uniformly while at the same time closing the bin discharge. Such a batcher is admirably suited to central mixing work and will deliver accurately proportioned batches of sand and stone into the mixing hopper, usually placed directly below, as fast as required. The delivery is also by gravity and one man operated.

In some localities it is now being specified that aggregates shall be measured by weight. To meet this requirement a batcher is suspended beneath the sand and stone openings in the storage bin and is so arranged both the fine and coarse materials are contained in it, the materials being separated by a steel partition. The flow of material from the bin is governed by a bin gate, controlled by a standard beam scale ingeniously connected with the batcher through an overhead system of levers. The scales and bin gate handles are arranged conveniently within the control of a single operator.

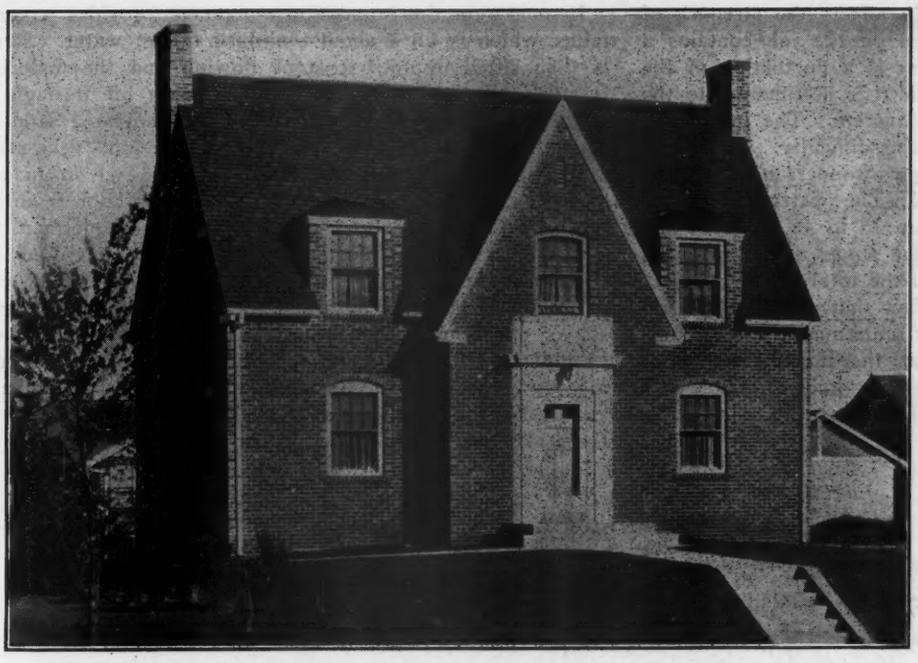
For operation the scale is set for the correct weight of stone and, after the stone has been weighed, it is reset for the combined weight of both stone and sand. Sand is then admitted until the scale balances. Experience in the field has shown that it takes only 30 to 45 seconds to weigh and discharge a batch of stone and sand by this method.

Probably the most radical innovation in proportioning methods is measurement by inundation. This method which has been used successfully for several years is now being specified and recommended by many leading engineers and contractors.

It is a well known fact that concrete produced by the old methods shows a lack of uniformity and a variation in strength. Thousands of tests made under the direction of Prof. Duff Abrams, by the Structural Research Laboratory of Lewis Institute, and also by other authorities, have proved that a comparatively slight variation in the amount



An 118-Ton Plant with Adjustable Measuring Batcher for Sand and Stone in Use in Central Mixing for the Construction of a Grain Elevator by the Folweco-Ahlskog Company, Council Bluffs, Iowa.



The "MANAWA"

A Common Brick house that has been built, sold, and lived in—proved practical and profitable. It is one of those shown in the brick house plan book—*"The Home You Can Afford"*—listed below. We furnish, at nominal cost, specifications, and complete original working blueprints for all these houses.

It's not what you *Build* —It's what you *Sell* THAT PAYS YOUR PROFITS

Have you anything to offer which other builders in your town do not offer?

Or are you just one of many builders—competing on price alone?

Here is one way you can step up out of the ranks—into leadership. Here is a way to SELL houses—instead of merely building them.

Brick Quality at Low Cost

You know that brick houses have *Beauty, Permanence, Comfort, Low Upkeep Cost, High Resale Value.*

These are all good sales arguments. They make a brick house easier to sell than any other type.

Especially when you can say—*"This is an All-Brick House"*—brick footings, basement walls—brick exterior walls all the way through and all the way around.

Such a house has a value far greater than its cost. Common Brick construction is low-cost construction—the lowest cost solid masonry walls—the lowest cost "hollow" masonry walls.

The books below show how to use Common Brick *skillfully*—new brick bonds and patterns, new wall textures, brick hollow walls—real brick beauty at lowest cost.

Send for these books. Many a builder has discovered in them the practical way to build houses that sell—All-Brick houses.

THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA

AT YOUR SERVICE

These District Association Offices and Brick Manufacturers Everywhere

Chicago	614 Chamber of Commerce Bldg.
Denver	1735 Stout St.
Detroit, Mich.	400 U. S. Mortgage Trust Bldg.
Hartford, Conn.	226 Pearl St.
Los Angeles	342 Douglas Bldg.
New York City	1710 Gr'd Cen. Term'l Bldg.
Norfolk, Va.	112 West Plume St.
Philadelphia	303 City Centre Bldg.
Portland, Ore.	906 Lewis Bldg.
Salt Lake City	301 Atlas Block.
San Francisco	932 Monadnock Bldg.
Seattle, Wash.	913 Arctic Bldg.
Springfield, Mass.	301 Tarbell-Watters Bldg.

2131 Guarantee Title Building
Cleveland, Ohio

Ask us to put you on our *"Builders' Register"*—so that we can refer local brick house prospects to you. This Association refers thousands of such inquiries to builders each year.

BEAUTY and ECONOMY Burned in Common BRICK

SEND FOR THESE BRICK BOOKS

"Your Next Home"—62 homes in picture and plan (10c)—
"The Home You Can Afford"—58 homes (10c)—
"Brick, How to Build and Estimate"—(25c)—
"Skintled Brickwork"—(15c)—
"Farm Homes of Brick"—(5c)—
"Brick Silos"—(10c)—
"Multiple Dwellings of Brick"—(10c)—
"Hollow Walls of Brick"—(Free)—

Send me the books checked above, for which I enclose the price indicated.

Name.....

Address.....

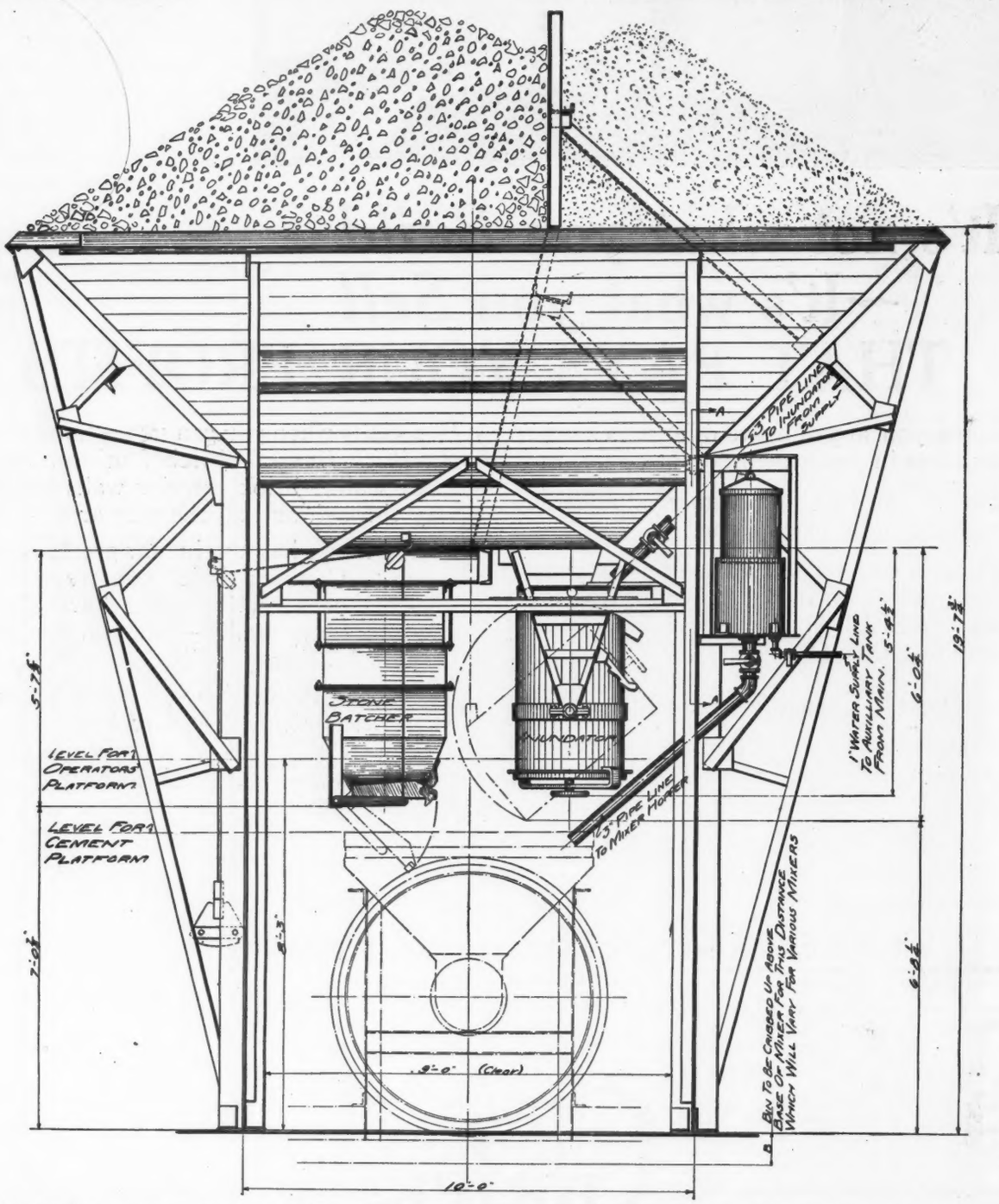
of water in each batch materially affects the strength of the concrete. Because sand used on the job contains a variable amount of moisture there is a fluctuation of the amount of water in the batch which is detrimental to the strength and uniformity of the concrete. The inundation system is designed to overcome this difficulty.

It also does away with the danger of undersanded batches caused by the bulking of sand. The water content of sand will cause a bulking of from 15 to 40 per cent and this results in unfilled voids in the stone, a hard working concrete and decreased volume of the total batch.

This system is based on the fact that completely inundated or submerged sand has the same measure by volume as that of bone dry sand, that the amount of water necessary to inundate the sand is a known factor and, therefore, that the additional water necessary for the batch can be accurately supplied.

In operation the inundation equipment provides a container which is filled about one-third full of water. Sand is then sifted in until it stops flowing and the material is stuck off, any excess of water running off through a chute at the top of the container. The inundated sand is then dumped into the mixing hopper and the necessary additional water is discharged into the batch from an excess water measuring tank. The entire operation requires only about 45 seconds and can be controlled by one man.

Equipment of the sort described is manufactured in various sizes to meet varying requirements. The largest of these, designed for large central mixing operations consist of one or more hopper type bins having capacities of as high as 350 tons each and equipped with the desired measuring equipment. For the small jobs portable plants are available which can be shifted from job to job and these are made in bin capacities as low as 18 tons.



This Drawing Shows a Typical 118-Ton Demountable Plant for Central Mixing with the Batcher and Innundation System, Illustrating the Relation of the Mixer to the Batcher and the Easy, One-Man Operation Which is Made Possible.

Apply SANI-ONYX in Half the Time

BECAUSE SANI-ONYX comes in large units—either tile pattern sheets or plain slabs—it may be installed in a fraction of the time required for other materials.

The use of SANI-ONYX plastic cement permits self-adjustment of slabs to the settling of floors and walls without cracking or other damage.

In the installation of SANI-ONYX there are no difficult feats to be accomplished—no baffling problems to be solved.

SANI ONYX
A VITREOUS MARBLE
A PRODUCT OF THE MARIETTA MANUFACTURING COMPANY

Unlike marble, tile or plaster, SANI-ONYX will not crack, check, chip or discolor. It is acid-proof, stain-proof, weather-proof and wear-proof. It isn't harmed by accidents that mar other materials, and will outlast the building itself.

Ideal for walls, floors and ceilings; for wainscoting, stair risers and treads; partitions, counters, railings, etc.

Register now for your complimentary copy of the big new, beautifully illustrated SANI-ONYX book.

This illustration demonstrates the possibilities of the new SANI-ONYX Tapestry designs. These designs are available in a variety of pleasing colors. Ask for samples.

We are always glad to furnish blue prints and samples of SANI-ONYX, and to answer your questions. Make free use of our Architectural Advisory Service.

MARIETTA MANUFACTURING CO.

Main Office and Works—80 BROOKSIDE, INDIANAPOLIS, INDIANA
Canadian Factory—Sani Products Co., Ltd., 155 Richmond Street, West, Toronto
Distributors in principal cities throughout the United States and Canada

The Right Paint for Every Job

THE point of first importance in any painting work is the selection of the right kind of paint for the purpose for which it is to be used. A paint which will prove highly satisfactory for one purpose may be entirely unsuited to others and the neglect of this consideration may prove just as costly as the entire neglect of painting where such protection is needed. Striking evidence of this is found in the experience of the Palmolive Company, of Milwaukee, Wis.

This company keeps records of all paint used and is continually experimenting to obtain the best paint for its various purposes. If a better paint makes its appearance at any time it is adopted, after being given careful tests under the plant conditions. The company is more interested in quality than in cost per gallon because it realizes that the cost of paint used on any job is only a small part of the total cost of the work, at the most, and that a higher first expenditure may mean a lower ultimate cost.

As a result of its experiments, three years ago this company painted the exterior of a concrete building which had been constructed five years previously. At this time the moisture had penetrated the surface and had reached the reinforcing causing it to rust and causing the surface to chip and scale off. Repairs made at the time of painting cost about $2,000 and the company definitely states that had the paint been used at the start this expense would have been entirely avoided.

The special paint which was used waterproofs the concrete and effectively prevents the sort of trouble previously experienced. It also improves the appearance of the building. The paint used is of a concrete gray and this same paint has also been used with great satisfaction on a brick building. Three years after applying, the company states that it will last indefinitely.

Other special paints are used inside the plant on concrete walls and ceilings and on machinery, in parts of the plant where the humidity and temperature are high and a certain amount of oil is present. Here ordinary paints have turned yellow within a week, in many places, while the special paint now used stands up for more than a year.

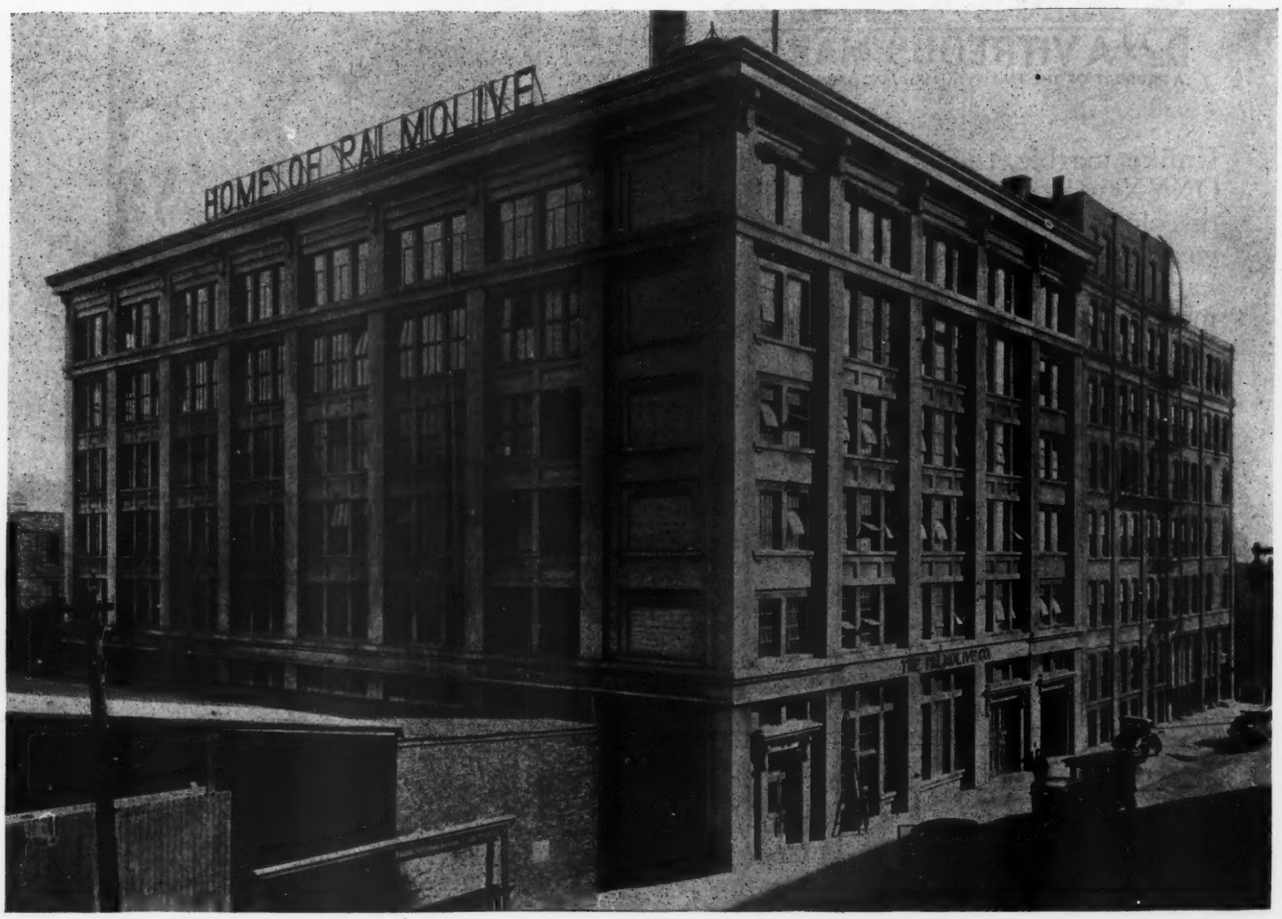
The Palmolive Company has also adopted a special paint for its tank cars used for shipping vegetable oils to the plant. This paint is suitable for use on steel sash or other exposed metal work in buildings and is therefore of interest to the building industry. A year and a half after painting the tank cars this paint is in perfect condition and will easily last four or five years. The paint formerly used had a life of only two years and the cost per gallon was practically the same as for the paint now used.

From a survey of this metal painting made by the A. C. Nielson Company, a disinterested engineering firm, it is shown that an annual saving of $19.42 is made on the painting of each tank car in use as a result of the use of this special paint.

✣

New Cutler Hammer Manager

ANNOUNCEMENT comes from the Cutler-Hammer Mfg. Co., of Milwaukee, Wis., that B. M. Horton, formerly of its Philadelphia office, has been appointed manager of the Boston office, succeeding J. M. Fernald who has resigned to enter a different field of business.



The Palmolive Company Makes a Study of Paints to Obtain Always the Best Product for Every Use. Some of the actual economies resulting from these experiments are described on this page.

Blue Print Plans

and 24 Page Book "How to Read Blue Prints"

Sent FREE

Our gift to every man in the building game. Sent absolutely free. For we want you to see for yourself . . . at our expense how easily and quickly you learn to read blue prints . . . and can get the knowledge that will make you more money. Don't send a penny. Just mail the coupon.

The Book Tells How

"How to Read Blue Prints" is written in plain, every day English. It is easy to understand . . . and will prove to you immediately how quickly you can get the training that has given other men the chance to work with their heads . . . and to make more money than just the wage scale.

We know this is true. For 23 years we have been training men . . . in their spare time, at home . . . to advance and succeed in the building field. Many have now got good contracting or building businesses of their own. Many are salaried men, foremen or superintendents.

This book is really a Free Trial Lesson in Plan Reading . . . written by a practical building expert. It costs you nothing . . . will teach you how to read Blue Prints . . . and may point the way for you to big money. It will show you how easy our instruction is . . . how quickly you can become an expert . . . can get the practical knowledge that you must have to get ahead quick.

Another Book FREE

We will send you also a book about the Chicago Technical School for Builders. It is free, too. It tells you all about our method of training by correspondence. It shows you how you can make your spare time pay you a handsome profit in a very short while. It tells all about our practical instructors . . . shows every branch and department of our Builder's Courses . . . gives you photographs of our men and departments . . . tells what others have done and what you can expect to do.

Chicago Technical School for Builders is one of the oldest and best equipped schools of its kind in America. Many big builders owe their first step to success to our training. Hundreds of practical men from the building trades attend our day and evening classes at our school for builders here in Chicago. You get this same training . . . from the same practical instructors . . . in your own home by mail.

Train by Mail

Go right on with your work. Your spare time . . . as little or as much as you wish . . . is all you need. Our practical lessons and actual blue print building plans come to you by mail. And the cost is little.

Send the coupon . . . today. It will bring you with the **free** Blue Print Plans and the two books, full information about the Chicago Technical School for Builders. Shows what we have done for hundreds of other men, gives the facts about their success. Tells how some became superintendents in a few months. How others established contracting businesses of their own. Gives all details of this practical builder's course with descriptions, photographs and illustrations.

Start now. It costs you nothing to find out what this practical builder's course is . . . and what it can do for you. If you want to make more money in the building game . . . get the facts about the Chicago Technical School for builders.

You Can Become a Building Expert

Plan Reading. Every man who has got very far ahead in any building trade can read blue prints. No man can expect to be a first rate foreman or superintendent until he knows what every line on a plan means and how to lay out and direct work from the architect's plans. By the Chicago Tech. Method you quickly learn to read any plan as easily as you read these words.

Estimating. Of course a man who wants to be a contractor or to hold a big job in a contracting organization must know how to figure costs of labor, material, and everything else that goes into any kind of building. The Chicago Tech. Course covers every detail of this important branch—shows you just how it is done from actual blue print plans.

Superintending. How to hire and direct men, how to keep track of every detail of construction as it goes on, how to get the work done in the least time at the lowest cost is also fully covered in the Chicago Tech. Builders' Course.

Also special courses in Architectural Drafting for builders, taught by practical men. These explained in Special Catalog "D" sent on request.

If You Live in or Near Chicago

Visit our School for Builders, open day or evening. 500 carpenters and builders attend each year. You can get the same training *at home*, by mail. Same plans; same lessons; same instructors. The Coupon brings all facts *Free*.

Mail the Coupon—NOW

CHICAGO TECHNICAL SCHOOL FOR BUILDERS

Dept. 836, Chicago Tech. Bldg., 118 East 26th St., Chicago, Ill.

Please send me without obligation your Free Books and Blue Prints for men in the Building Trades. Send postpaid to my address below. It is understood that no salesman will call on me.

[Write or print name plainly]

Name.....

Address.....

City ..... State.....

CHICAGO TECHNICAL
SCHOOL FOR BUILDERS
Dept. 836, Chicago Tech. Building, 118 E. 26th St., Chicago, Ill.

The Cost Per Ton Mile

The Method of Figuring This Significant Cost Item Is Quite Simple, Actual Figures May Be Substituted for Those Used Here

REFERENCE is frequently made, in this department and elsewhere, to the cost per ton mile as the final test of the efficiency of a truck and its suitability for the work which it is being called upon to do. It is quite likely that there are some who are not familiar with considering questions of transportation, and therefore are not entirely sure of the meaning of this term cost per ton mile. Others, while understanding the meaning of the term, are not sure how this cost should be figured on their own trucks.

The cost per ton mile means exactly what it implies, the cost of hauling one ton of load one mile. In figuring this amount it must be remembered that while the number of ton miles is figured on the basis of miles traveled with a load, the cost must also include those miles traveled without load which add to the cost of the actual hauling.

On this basis we will assume certain conditions and figure the cost per ton mile under those conditions. Any truck operator may then find his own cost per ton mile by merely substituting the figures from his own cost record. We will say that a truck is being used for hauling sand to a big construction job. This truck carries a five-ton load at each trip and returns empty to pick up another load. The distance, each way, is six miles and four round trips are made in a day.

This gives us a total mileage of 48 miles a day, one-half of the distance carrying load and the other half running empty. The cost of operating the truck is known to be $20 a day. The cost per mile is found by dividing $20 by 48, the number of miles traveled a day. The result is 42 cents per mile.

Now to find the average ton mile we multiply the number

Here Is a Lumber Truck with a Body Especially Equipped with Rollers for Quick Unloading. On the next page the same truck is seen loaded with lumber and another chassis, of the same model, equipped with platform body, is loaded with heavy bags of cement, a story of truck versatility in pictures.

The World is Full of Repeat Orders for

International Harvester Motor Trucks

When the Tampa Rock Co. wrote this letter last summer they had the trucks shown at the right. Now—the Internationals, "in large part," have doubled their business and the size of their International fleet.

TAMPA ROCK COMPANY
Building Materials
Office and Yard—1014-1016-1018 Lozano Street
Rock Crushing Plant—507 Maxwell Avenue

Gentlemen: Tampa, Fla., August 21, 1925

We want you to know that we are enjoying perfect satisfaction from our five International trucks. Our rapidly increasing business is due in large part to the unfailing performance of our International fleet. And your service is all that is claimed for it.

When we buy more trucks we will buy Internationals.*

Respectfully yours,

*See photo below, taken recently. RALPH L. NICHOLS, *President*

* * *

International Harvester Trucks will be *profitable* trucks for *your* hauling. Evidence everywhere proves it. The full line will fit your needs—it includes the "Special Delivery;" the 1-ton Speed Truck; the 1½-ton "SL," long wheelbase and specially low; the 1½-ton "SD" for light dump and trailer work; and Heavy-Duty Trucks up to 5-ton.

Remember that we have the largest Company-owned truck service organization in the world—owning 120 branches in the United States alone. Write us for further information.

INTERNATIONAL HARVESTER COMPANY
606 S. Michigan Ave. OF AMERICA (*Incorporated*) Chicago, Ill.

No wonder the Winfield Lumber Co. standardized on International

Gentlemen:

We began using International Harvester Co. trucks about seven years ago and results obtained were so satisfactory that we disposed of other makes we had and finally standardized on Internationals.

We now have in service six of their trucks and they are giving splendid service in every way. We have no complaint whatever to make. In fact, our truck equipment gives us less trouble than any other branch of our mechanical department. Our repair bills are practically nothing. Our trucks are busy all the time; we really cannot say too much in favor of them. We would not change for any other make we know of at present time.

Yours very truly,

WINFIELD LUMBER COMPANY,
Gadsden, Ala.

The Tampa Rock Co. now owns 10 Internationals

of miles per trip, which is 12 miles, by the average number of tons carried which is five tons, and divide this by two, because the load is carried only one way, the truck returning empty. Twelve multiplied by five, divided by two, gives 30 as the number of ton miles for each trip. Since four trips are made a day then the total number of ton miles will be four times 30, which equals 120 ton miles per day.

Perhaps a simpler way to state this would be to say that while the truck travels 48 miles a day, it travels only 24 miles under load. When under load it carries an average of five tons; in other words, it hauls five tons 24 miles. Multiplying five tons by 24 we get 120 ton miles, because hauling five tons 24 miles is equivalent to hauling one ton 120 miles.

To obtain the cost per ton mile, then, we divide total cost per day, $20, by the number of ton miles, 120, which gives us a cost per ton mile of 16⅔ cents. It is now a simple matter to substitute actual cost figures for the ones which have been used here and calculate, in the same manner, the cost per ton mile for any truck on any job.

All Three of the Trucks Illustrated on These Pages Have Exactly the Same Chassis, but This Chassis Is Shown Equipped with Two Different Types of Body, to Adapt It to Two Different Types of Work.

✣

Practical Pick-ups

TO tell the hand of a door, stand facing the door from the outside. If the butts are to the right and the door swings from you, it is a right-hand regular door. If the butts are to the left, the door swinging from you, it is a left-hand regular door. If the door swings toward you, butts to the right, the door is a right-hand reverse. If the butts are to the left, the door swinging out, it is a left-hand reverse.

Looking at casement windows from the roomside, butts to the right makes them right-hand, but if the butts are to the left they are left-hand.

Closet doors are judged from the roomside; butts to the right, right-hand; to the left, left-hand.

The purpose of knowing the hand of doors is to make it possible to intelligently order locks for them by simply mentioning the hand.

Ordinarily locks come put together for the right-hand doors and most of the locks are so constructed that they can easily be changed to left-hand.

A right-hand stairway, speaking of open stairways, is one that has the handrail to the right on ascending the stair. If the handrail is to the left, the stairway is left-hand.

That reminds us of right and left-hand men, particularly carpenters. A right-hand carpenter and a left-hand carpenter, if compatible with each other in disposition, make a valuable team on any job. There are things that come up on almost every job that only one or the other of such a team can do with his right hand. (The left hand of a left-hand man is his right hand.)

Sawing off roof sheathing, especially on steep roofs, makes such a team a valuable asset to a gang of men. One side can be cut handily by one, and the other side can be easily cut by the other. A right and left-hand man can work to great advantage on shingling.

Some right-hand men are otherwise called "pets." Whenever a man gets the "pet" handle attached to his name he usually becomes a liability on the job. However, the boss may not know it.

Just as there are right and left-hand people and things, just so there are right and wrong ways of doing things. For instance, the putty on sash should usually be to the outside of the building, but not always. All of the steel sash that we have ever seen had the putty on the inside.

Front doors should be hung with the putty side out, not the top side. However, glass for outside doors is beaded in putty.

The smooth side of glass, such as corrugated, Florentine, prism, etc., should be to the outside when set. The bevel side of beveled plate glass should be toward the outside.

Rooms with the least amount of traffic should be the first to be finished, and those with the greater amount of traffic should be finished last. For that reason the upper part of a house should be plastered first, thus bringing the plasterer's work in harmony with the carpenter's work. What is plastered first will be dry first and consequently can be finished first.—H. H. SIEGLE.

A Whole Truck Load of Lumber, Like This, Can Be Unloaded in a Few Moments When the Load Is Carried on Rollers Set Into the Platform, Making It Easy to Slide the Entire Load Off at Once.

K

Better traction and mileage than any other tire

PHONE 4265

D. W. McFADDEN

All Kinds of Light and Heavy

HAULING

CEMENT WORK

44 LAW BLDG.

ASHEVILLE, N. C.

January 8th, 1926.

Kelly-Springfield Tire Company,
Charlotte, North Carolina.

Gentlemen:

I am enclosing picture of my three White Trucks, which I have had equipped all around with 32 x 6 Kelly Heavy Duty Cords, dual equipment on the rear.

We are using these trucks on a five mile haul up a very steep mountain grade, and find the traction and mileage is far in excess of anything I have ever received from any make of tires.

I cannot recommend your equipment too highly and am one hundred per cent Kelly booster.

Very truly yours,

D. W. McFadden

KELLY-SPRINGFIELD TIRES

NEWS of the FIELD

Company Changes Hands

ANNOUNCEMENT was recently made that G. L. Miller & Co., 30 East 42nd Street, New York City, had been taken over by a combination of labor and banking interests. This company is one of the oldest and largest real estate investment houses in the country and its business is that of specialist in the underwriting and selling of first mortgage bonds secured by real estate such as office buildings, hotels, apartments and apartment hotels in the principal cities of the country.

With increased capital and the backing of several large and influential banks, the underwriting business of this company will be increased under the new management.

✣

House Models Bring Business

ONE of the most interesting exhibits at the recent Home Builders' Show, in Detroit, Mich., was that of the F. M. Sibley Lumber Co. A miniature house shown in this company's booth attracted much attention. It was one of two which have been used extensively by The Chatfield Manufacturing Co., makers of roofing products of Cincinnati, Ohio, at various shows and lumber conventions.

As a Part of the Exhibit of the F. M. Sibley Lumber Co., at the Detroit Home Builders' Show, a Miniature House Built by The Chatfield Mfg. Co. Attracted Much Attention.

This company reports an unusual demand for these miniature houses during the last two months and they have been exhibited in bank lobbies in both Detroit and Cleveland. These banks report that their customers have displayed a great interest in house building as a result of the exhibits and that they have procured some highly desirable financial business in this way.

✣

Celotex in the Arctic

AN important factor in the success of Lieutenant Richard E. Byrd's recent airplane dash to the North Pole was Celotex insulating lumber, used to erect a home for the exploring party at its Spitzbergen base. It is much colder in the Arctic regions in May, when the flight was made, than during the usual season for such attempts and, therefore, it was doubly essential to protect the party aaginst the extreme cold and also to protect the radio equipment with which the base was able to keep in touch with the outside world and with the plane during its flight.

Because of its lightness and high insulating value, Celotex was selected as a protecting material and the base was built entirely of it. The explorer's ship, "Chantier," was also lined with Celotex as an additional precaution and it met the test to the entire satisfaction of the party.

✣

McMullen Head of Engine Company

AT the recent annual meeting of the stockholders and directors of the Fuller & Johnson Mfg. Company, Madison, Wisconsin, C. L. McMullen, formerly vice-president and director of sales, was elected president. Mr. McMullen began his career with the Fuller & Johnson Mfg. Company in 1902 and has rapidly advanced with the growth of this organization. The other officers, elected at the same meeting, who constitute the board of directors are: W. W. Gore, vice-president, director of engineering, C. K. Swafferd, vice-president, director of production; H. C. Wolf, treasurer, director of purchase; Paul Kney, secretary, director of credit and finance, and M. J. Esser, assistant treasurer, director of accounting.

C. L. McMullen, Recently Elected President of the Fuller & Johnson Mfg. Company, of Madison, Wis.

✣

Name of Company Changed

THE name of Cello Products, Incorporated, has recently been changed to Acetol Products, Inc. The new name was taken as most satisfactorily covering the diversified line manufactured by this company and is a change in name only. The ownership and management are in no way affected by the change and the headquarters remains at 21 Spruce Street, New York City, just as formerly.

✣

Weatherbest Distributes Cedartile

THE Weatherbest Stained Shingle Co., Inc., North Tonawanda, N. Y., has secured exclusive rights as distributors, for the entire eastern half of the United States, of Cedartile red cedar shingles These shingles are a new type of shingle designed to give the same roof effects obtained with tile and are manufactured by the J. E. Pinkham Lumber Company, of Seattle, Washington.

✣

Perfects New Saw

RALPH M. KENNEDY, 111 North [illegible] Philadelphia, Pa., is perfecting a new portable ball-bearing, swing saw, which will be ready for the market this fall. It is expected that this swing saw will meet many needs in the building and industrial fields because of its simplicity and utility.

For Lower Cost Per Ton Mile

There is no longer any considerable area in the United States where the roads are all bad. Nor is there any great space in which the roads are all good.

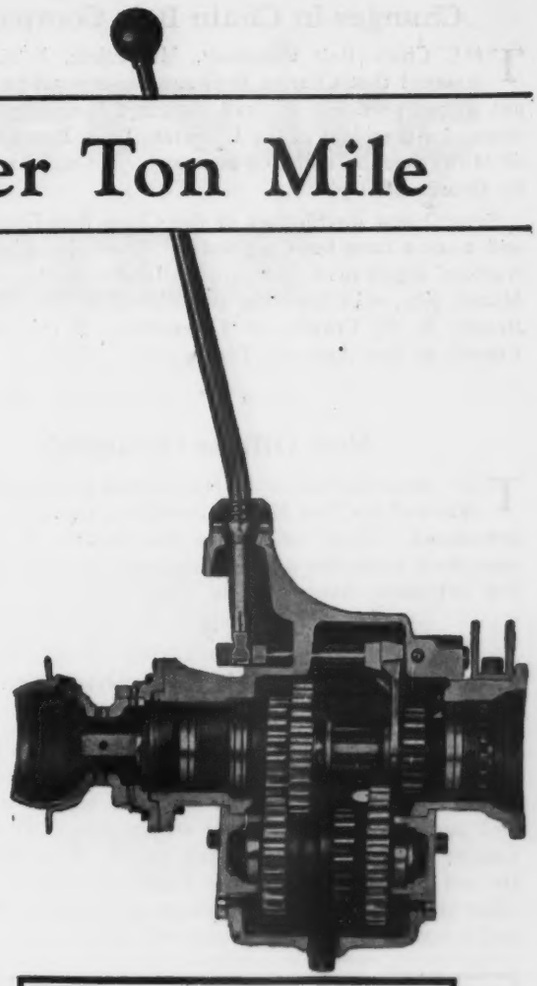
These are important considerations for the truck buyer. The most economical truck he can buy is the one that gives unfailing performance in the heaviest going, and speed truck pace on the paved highway. It is not enough that the truck shall have one qualification or the other, *it must have both.*

The Ford truck, equipped with the Super-Warford three speed transmission meets these requirements squarely. It provides an *underdrive* which gears down the normal Ford speeds, providing an abundance of power for mud, sand and short steep grades that are so often encountered a mile or two beyond the pavement.

It provides an *overdrive* which gears up the normal Ford speeds, providing high speed on the paved roads without increasing engine revolutions.

Warford is particularly adapted to the Ford truck because of its *three point suspension,* the basic principle of Ford design. The transmission is suspended between *two* universal joints and supported by a sturdy cross member which also reinforces the Ford frame.

The net result of the Warford equipped Ford truck is lower cost per ton mile for every conceivable hauling job from two to four tons. Thousands of these trucks have replaced equipment costing many times as much.



Ask the Ford Dealer or the Distributor nearest you about Warford equipment

Albany, N. Y.	Foster-Warford Co.
Atlanta, Ga.	Atlanta-Houdaille Co.
Auburn, N. Y.	Foster-Warford Co.
Buffalo, N. Y.	Foster-Warford Co.
Canton, Ohio	Dine-DeWees Co.
Charlotte, N. C.	Hall-Warford Co.
Chicago, Ill.	Sieg-Warford Co.
Columbia, S. C.	Warford-Sales Co. of S. C.
Dallas, Texas	Houdaille-Polk Co.
Davenport, Iowa	The Sieg Company
Denver, Colo.	Motor Specialties Co.
Detroit, Mich.	Transmission Sales Co.
Haverhill, Mass.	Massachusetts Warford Co.
Idaho Falls, Idaho	Auto Parts Company
Indianapolis, Ind.,	Kenney Equipment Co.
Kansas City, Mo.	Warford-Western Co.
Lewiston, Me.	Maine-Warford Co.
Los Angeles, Cal.	Hammel-Gerke Co.
Mansfield, La.	W. C. Nabors
Memphis, Tenn.	Wayne Spinks Co.
Morrisville, Vt.	McMahon Bros.
Philadelphia, Pa.,	Warford-Eastern Co.
Pittsburgh, Pa.,	Warford-Pittsburgh Co.
Portland, Ore.	Woodward Sales Co.
Richmond, Va.,	Baker Equipment Eng. Co.
Rockford, Ill.,	Schacht Tuck Co.
San Francisco, Cal.	Warford-Pacific Co.
Seattle, Wash.	Warford-Equipment Co.
Spokane, Wash.	George H. Dietrich Co.
St. Paul, Minn.	McGee-White Corp.
Stockbridge, Mich.,	Transmission Sales Co.
Tampa, Fla.,	Wholesale Auto Supply House
Washington, D. C.	S. J. Meeks' Son
Witchita, Kan.,	Warford Distributing Co.
Windsor Ont. (Home Office)	Warford Corp. of Can. Ltd.
Toronto, Ont.	Warford Corp. of Can. Ltd.
Montreal, Quebec,	A. C. Lewis
Calgary, Alta	Maelim Motors Ltd. / Universal Motor Co. Ltd.
Edmonton, Alta.	Dominion Motors Ltd.
St. John, N. B.	J. H. Irving
Vancouver, B. C.	E. W. Jay
Winnipeg, Man.	Dominion Motors Ltd.
Regina, Sask.	Canadian Motors Ltd.
Moosejaw, Sas.	Moosejaw Motors Ltd.

Warford PRODUCTS

The Warford Corporation, 44 Whitehall St., New York City

Neither the Warford Corporation nor its manufacturers has any connection whatsoever with any company manufacturing motor cars.

Changes in Chain Belt Company

THE Chain Belt Company, Milwaukee, Wis., has announced that Charles E. Stone, for several years assistant to the president of that company, has resigned to become vice-president of the Interstate Drop Forge Company, of Milwaukee, an affiliated company. He will be succeeded by George M. Dyke.

Several new distributors of the Chain Belt line of pavers and mixers have been appointed. These include the Contractors' Equipment Company, 2315 North Miami Avenue, Miami, Fla., with branches at Jacksonville and West Palm Beach; E. F. Craven, of Greensboro, N. C., and J. F. Francis of San Antonio, Texas.

✣

New Offices Occupied

THE consolidation of the factory and sales and executive offices of the Van Kannel Revolving Door Co., has been announced. These offices are now located in a recently completed extension of the company's factory building at 716 Whitlock Avenue, New York City.

✣

T. L. Smith Distributors

THE T. L. Smith Company, of Milwaukee, Wis., announces the appointment of the Arizona Tractor & Equipment Company, of Phoenix, as distributors for the state of Arizona. A full line of Smith mixers will be carried and a complete stock of repair parts. The Howard-Cooper Corporation, with warehouses at Boise, Idaho; Seattle and Spokane, Wash., and Portland, Ore., is now handling the Smith line in the states of Oregon, Washington and the west half of Idaho and maintains a complete stock.

A New Display System

THOUGH dealers are often anxious to feature the sale of some of the larger fixtures they are sometimes financially unable to invest in floor samples and find it difficult to visualize these fixtures, to customers, by word of mouth. To meet this obstacle to the sale of its water softeners and water systems, the Duro Company, through the assistance of Albert L. Block, Inc., has employed a new type of display with marked success.

This display is an exact reproduction of the article itself, in full colors, lithographed on a special paper, heavily mounted and easel backed with a thin line outline. The dealers have found this so efficient for various display uses that the Block organization has applied for patents covering the field of a number of household necessities for the process of making and those features which reduce the fading of colors and the warping of the display.

✣

Company Name Changed

AN announcement has been made that the name of the Mark W. Wertheim Sales Corporation, 303 4th Avenue, New York City, has been changed. This company will hereafter be known as the 20th Century Woodworker, of New York, Inc. This company is distributor for the Cresson-Morris Company, of Philadelphia, manufacturers of 20th Century woodworkers.

✣

Appoint Engineer of Tests

O. L. MOORE, formerly engineer, Inspection Bureau, Universal Portland Cement Co., has been appointed to the position of engineer of tests in that company, according to an announcement from the Chicago office of the Universal company.

Beautifying the Old Battle Line

ATOP-MISSIONARY-RIDGE

COST IS SOON FORGOTTEN—QUALITY NEVER!

Architect—LOUIS BULL
Brick—CARLYSLE-LABOLD DARK CHOCOLATE
Mortar Color—PARAMOUNT CHOCOLATE 536

PARAMOUNT COLORS
in shades to harmonize with every make of brick.
Used by exclusive dealers thruout U. S. A.

THE LOOKOUT PAINT MFG. CO., Chattanooga, Tenn.

Truck Service Problems

Whether operating one truck or a fleet, service is a factor of prime importance in your business. Trucks must be kept busy and earning.

Performance has demonstrated the dependability of Graham Brothers trucks.

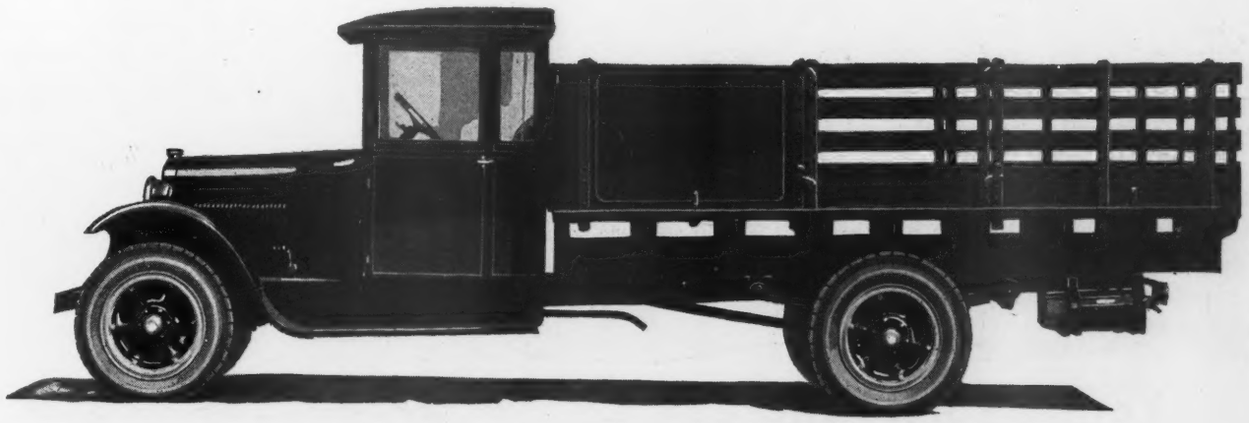
But when service is needed there is an experienced Dodge Brothers dealer near. The service is efficient. Shop well equipped. Men trained and experienced. Parts are obtainable at low costs without delay.

[*Graham Brothers Trucks, with Dodge Brothers ¾-Ton Commercial Cars, meet 90% of all haulage requirements.*]

1-Ton Chassis (G-BOY)	$ 885
1½-Ton Chassis - - -	1245
MBM Low Chassis - -	1295

f. o. b. Detroit

GRAHAM BROTHERS
Evansville – DETROIT – Stockton
A Division of Dodge Brothers, Inc.
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO



STAKE BODY MODEL 222; CAB 205 V, CHASSIS LBM

GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Books, Bulletins and Catalogs fdr You

THE literature and publications listed here are available to the readers of American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

The Century Brass Works, Inc., Belleville, Ill., has published its new catalog M covering a complete line of sanitary drinking fountains, ice-cooled drinking fountains and specialties.

The Southern Pine Association, New Orleans, La., has prepared a booklet illustrating a series of advertisements to be used in going after business by utilizing the growing interest in grade marked and trade marked lumber.

"New Building Estimators' Handbook," by William Arthur, published by the Scientific Book Corporation, 15 East 26th Street, New York City, this is a new and revised edition, the fourteenth, of this handbook with an index which greatly facilitates its use of quick reference. Price $6.

"Truscon Roofs of Security" is the title of a new booklet prepared by the Truscon Steel Company, Youngstown, Ohio, to present its two types of steel roofs and is largely descriptive.

The Marietta Manufacturing Company, 80 Brookside, Indianapolis, Ind., has issued a folder, for A. I. A. filing, illustrating, in colors, its Sani Onyx.

The Clinton Metallic Paint Company, 50 Clinton Road, Clinton, N. Y., has three pamphlets covering its silk fibre elastic roof cement, its multi-colored stucco, and its mortar colors.

"Durable Douglas Fir" is a booklet published by the West Coast Lumber Trade Extension Bureau, 5560-62 Stuart Bldg., Seattle, Wash., for the purpose of telling the story of Douglas fir as "America's permanent lumber supply."

"Trane Heat Cabinets" is a booklet giving full information on the new type of heating unit manufactured by The Trane Company, La Crosse, Wis. It is prepared for A. I. A. filing system.

The Hart & Hegeman Mfg. Co., 342 Capitol Avenue, Hartford, Conn., has issued its new catalog S, "Electrical Wiring Devices," including full information on its new lines and additions to its present lines.

The Reid-Way Company, 1295 Elmhurst Drive, Cedar Rapids, Iowa, offers a blue print folder illustrating and explaining in full the many uses of its electric sander.

The Union Metal Manufacturing Company, Canton, Ohio, has a small pamphlet on ornamental sign standards and a booklet, No. 55, on ornamental filling stations and lamp standards.

"The New G-E Soldering Iron" is a pamphlet describing this new electrical soldering iron manufactured by the General Electric Company, Bridgeport, Conn.

"Evidence" is the title of a descriptive booklet and catalog of the Bull Dog floor clips made by The Bull Dog Floor Clip Company, 108 North First Street, Winterset, Iowa.

The Bridgeport Brass Company, Bridgeport, Conn., has published an Instruction and Data Book on Bridgeport-Keating flush valves.

Slate Association Is Active

THE Bangor Slate Association, whose membership is composed of the sole producers and selling agents of genuine Bangor slate, has reopened its offices at 35 Broadway, Bangor, Pa. The association will continue its work of supplying information regarding genuine Bangor slate to the contractor, architect and prospective home builder, protecting the users of this slate by inspecting, labeling and certifying each shipment. An extensive campaign will be inaugurated to bring about the wider appreciation and use of Pennsylvania slate as a roofing material.

Your Profits Increased

painting the improved DeVilbiss way

Faster painting, more jobs done in present working time, less cleaning up—that's one way your profits are increased painting with the DeVilbiss Spray-painting System.

The greater satisfaction of your customers with the improved quality of painting, as well as with the short time jobs require, brings increased profits through widespread endorsement of your work and methods.

DeVilbiss equipment is practical, complete and reliable. Its operation and upkeep costs are negligible items. Your men will like to paint with it and you'll like the DeVilbiss service

We'll gladly mail you further FACTS regarding DeVilbiss equipment and how painting with it will increase your profits. Address—

THE DeVILBISS CO. 238 Phillips Ave. TOLEDO, OHIO

New York
Chicago
Detroit
San Francisco
Cleveland

DeVilbiss
Spray-painting System

Indianapolis
St. Louis
Milwaukee
Minneapolis
Windsor, Ontario

Comparing Quality of Brush-painting and DeVilbiss Spray-painting

[Showing enlarged cross sections of brushed and sprayed paint films]

The brushed surface shows ridges and thin streaks (brush marks). The paint film wears down unevenly and does not protect the surface any longer than those thin streaks last.

The uniform sprayed coat wears down evenly. This strong, unbroken film of paint is still saving the surface long after the thin brushed streaks of paint have disappeared.

Ganahl Lumber Co., of St. Louis, says: "Back in 1908 we bought 6 of your early models. They proved so efficient and economical that in 1921 we purchased 2 of your 3½ ton models. They have given good service and are running every day. Last month we added a GMC 2½ ton truck, which is the best recommendation that we know of."

These GMC features mean

Low Running Expense

and greater truck profits

Gas; oil; tires;—these items of expense can make or break your truck profits. The GMC you buy today is the direct result of 24 years of successful truck building. And this long experience, plus General Motors unusual engineering and manufacturing facilities, has developed features which *reduce the running expense of GMCs to a point which is attractive to the operator.*

Engine

Each cylinder wall is a separate removable sleeve—accurately machined to even thickness. Expansion and contraction are therefore equal in all parts insuring a *continuous close-running fit of the pistons* and preventing loss of power.

Light weight pistons and connecting rods reduce fuel and oil consumption.

Unusually accurate valve action saves fuel.

GMC system of oil straining saves oil.

The plain tube carburetor, with its simple and easy adjustment insures real fuel economy.

GMC 2-Range Transmission

[Giving 9 different gear ratios]

Effects great fuel savings by allowing all work to be done with the engine operating at its highest efficiency. Also it saves tires because heavy loads can be started without jerking. An exclusive GMC feature on all models of 2½ tons and larger.

Rear Axle

Provided with radius rods to relieve springs of driving thrust. Springs absorb starting and driving torque, resulting in greater pulling ability and more tire mileage.

GMC TRUCKS
PRODUCT OF GENERAL MOTORS

Sold and Serviced Everywhere by Branches, Distributors and Dealers of

GENERAL MOTORS TRUCK COMPANY, Pontiac, Michigan

A DIVISION OF YELLOW TRUCK AND COACH MANUFACTURING COMPANY

GMC 1, 1½ and 2½ ton trucks | GMC Big Brute 3½ and 5 ton trucks | GMC Big Brute 4 to 15 ton Tractor Trucks

Co GMT Co—1926 | Yellow Cabs | Yellow Coaches | Yellow Light Delivery Trucks | Herts Drivurself Cars

Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to the readers of American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

Albert Pick & Company, 208-224 W. Randolph Street, Chicago, has published a new general catalog of its complete line of equipment furnishings and supplies for hotels, restaurants, clubs and institutions.

"The Wire Rope Users' Handbook" has been published by the American Cable Company, Inc., 105 Hudson Street, New York City. It contains, in addition to the company's general price list, much useful data including a good description of "How to Splice Wire Rope."

The Southern Pine Association, New Orleans, La., has published a monograph on "The Greater Strength of Southern Yellow Pine" which discusses the subject of stress and includes recommendations for the correct use of southern yellow pine.

The Cresson-Morris Company, 18th and Allegheny Avenue, Philadelphia, Pa., offers a pamphlet on its 20th Century saw which is described as an overhead saw with a 17-inch crosscut.

The Speakman Company, Wilmington, Del., has prepared a loose leaf edition catalog, No. H, which illustrates the Speakman showers and fixtures.

"Ryerson Journal and Stock List," published bi-monthly by Joseph T. Ryerson & Son, Inc., Chicago, contains a number of interesting articles and a list which is described as "The Key to Immediate Steel."

"The Upsonizer," monthly periodical of The Upson Company, 305 Upson Street, Lockport, N. Y., contains, in the June issue, some interesting material showing the dealer how he may profit by the company's advertising.

The Portland Cement Association, 33 W. Grand Avenue, Chicago, has published a booklet under the title "The Concrete of the Architect and Sculptor," with an introduction by Lorado Taft and written by John J. Early, both conspicuous figures in their fields.

"National Lumber Handbook," dated June 1, 1926, and published by The National Lumber Manufacturers' Association, Transportation Building, Washington, D. C., contains complete descriptions and sketches of the prize winning devices in the recently concluded waste prevention contest.

"Making Homes Beautiful" is a pamphlet illustrating in colors the application of stained shingles, as manufactured by the Weatherbest Stained Shingle Company, Inc., 113 Main Street, North Tonawanda, N. Y., in the production of attractive homes.

The Rocbond Company, Van Wert, Ohio, has published a booklet entitled "Rocbond Exterior Stucco in Florida," gotten up in attractive style and bound in an attractive cover, illustrating many of the fine stucco homes in Florida.

The Structural Slate Co., 104 Robinson Avenue, Pen Argyl, Pa., offers a new booklet on its Struco (colored) slate which shows a number of installations in full colors.

The Wm. H. Page Boiler Company, 200 Madison Avenue, New York City, has just issued a new catalog, No. 52, of its line of boilers for heating buildings of all types by steam, vapor and hot water and with any fuel.

The U. S. Department of Commerce, Washington, D. C., has prepared two new publications. These are "A City Planning Primer" and a "Report of Compression Tests on Brick Masonry."

"Terra Cotta of the Italian Renaissance," published by the National Terra Cotta Society, 19 W. 44th Street, New York City, is a book which contains 200 full page plates illustrating early Italian work. Price $3.

Build and Sell Homes in the Suburbs Now —*Don't Wait for Sewers*

"Out to the suburbs," is now the nation-wide cry. The city dwellers want plenty of lawn, green grass, garden, orchard, sunshine and blue sky. Folks are tired of living where they daily toil for their bread and butter.

People realize that it is not necessary to live in the city nowadays just for the sake of city comforts and conveniences. Modern homes with sanitary plumbing are now easily procured anywhere.

The problem of sewage disposal is perfectly solved with the safe, modern, economical

San-Equip Septic Tanks

for all unsewered districts. Don't let lack of sewers worry *you*.

San-Equip Septic Tanks follow U. S. Public Health Service design. Thousands are in use. No failures. Fully guaranteed. Easily installed.

Write for Our Free Plan Sheets

Sell San-Equip Septics with the lot or use our free plan sheets to help you sell. Our advertising is telling more than half your prospective home buyers about the San-Equip idea of sewage disposal.

San-Equip Septic Tanks are rust-proofed copperoid iron tanks—correct design—water tight—unbreakable—ready to connect.

Look one over at our risk. Prompt shipment from warehouse near you.

CHEMICAL TOILET CORPORATION

921 FREE STREET, SYRACUSE, N. Y.

for Economical Transportation

CHEVROLET

Another Chevrolet Achievement

$55 Reduction on 1-Ton Truck

New Low Prices

1-Ton Truck reduced to $495

½ Ton Truck reduced to $375

(Chassis only) f.o.b. Flint, Michigan

Engineered to meet the most severe requirements of commercial haulage, Chevrolet trucks have won worldwide acceptance on the basis of low first cost, low operating cost and slow depreciation.

This spectacularly growing popularity has made necessary a greatly increased production—the economies of which are now passed on to buyers in the form of a drastic price reduction.

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

World's Lowest Priced Gear-shift Trucks

Books, Bulletins and Catalogs for You

THE literature and publications listed here are available to the readers of American Builder. They may be obtained from the firms mentioned and will be forwarded without cost except where a price is noted.

The U. T. Hungerford Brass & Copper Company, New York City, has prepared a new general catalog bound in hard covers covering its line of brass, copper and bronze sheets, tubes, rods, wire, rivets, nails, etc.

The Graver Corporation, East Chicago, Ind., has published a bulletin, No. 509, completely illustrating and describing its zeolite water softener equipment.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is distributing a new publication, M. A. C. 7379, which treats the subject of motors and their control for heating and ventilating modern buildings.

"Introducing 'Cal Pine'" is the title of a new publication from the California White & Sugar Pine Manufacturers' Association, 656 Call Building, San Francisco, Calif., which is an illustrated presentation of the grades of California white and sugar pine as produced by the mills of the association members.

The United States Radiator Corporation, Detroit, Mich., has prepared a most attractive pamphlet in colors illustrating its new Capitol radiator.

Cornell Wood Products Company, 190 N. State Street, Chicago, has prepared a pamphlet of letters from its customers telling what they think of the company and its products.

The Ingersoll-Rand Company, 11 Broadway, New York City, offers a new publication under the title "Direct-Injection Oil Engines for All Purposes," cataloging its line of oil engines.

"Crescent Elastic Tile Floors" is the title of a pamphlet issued by the United Cork Company, Lyndhurst, N. J., describing its line of composition cork tile in colors.

Crouse-Hinds Company, Syracuse, N. Y., has prepared a fully descriptive, illustrated pamphlet on its conduits for grounding service wire and conduit systems.

The Concealed Bed Corporation, 58 E. Washington Street, Chicago, distributors for the Holmes Disappearing Bed Company, has published a most interesting booklet fully covering its line of disappearing beds.

"Book of Rafter Lengths" is the title of a small booklet published by The Swanson Square Company, 7 N. 4th Avenue, Maywood, Ill., for use with the Swanson speed square for easy rafter framing. Price 30 cents.

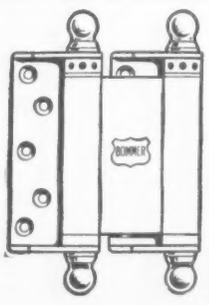
The Broderick & Bascom Rope Company, 801-809 N. First Street, St. Louis, Mo., publishes a monthly periodical called "The Yellow Strand." The May issue is the golden jubilee number marking 50 years' record in the manufacture of wire rope.

The Carney Company, Mankato, Minn., offers three pamphlets containing full information on Carney mortars for brick, tile, and terra cotta.

The Red Cedar Lumber Manufacturers' Association, 4849 Stuart Bldg., Seattle, Wash., has published a most interesting little booklet on "Preserving the Charm of the Pergola."

"The Water Supply for Swimming Pools" is a bulletin just issued by the Graver Corporation, East Chicago, Ind., giving full and complete information on refiltering and recirculating systems for all types of swimming pools.

"Putting Quality into Concrete Products" is the title of a booklet published by the National Lime Association, 918 G Street Northwest, Washington, D. C., describing the use of lime for the improvement of all types of concrete work.



Buy the Best
HARDWARE
For Hard-wear

For more than 48 years Bommer Spring Hinges have maintained their leadership and proven their superiority over all others.

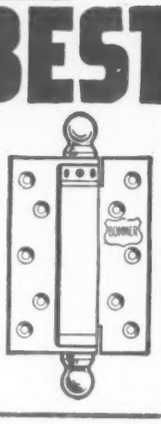
They have kept pace with the times, because they have been kept up with the times whenever improvement was possible.

BOMMER SPRING HINGES ARE THE BEST

They are in universal demand—easiest to apply and the most satisfactory spring hinges made.

Your Dealer handles them.

Send for New Catalog 47. It is a big help in ordering.



Bommer Spring Hinge Company
MANUFACTURERS
BROOKLYN, N. Y.

These HEAT WAVES show how the heat RISES and ESCAPES through the roof and walls of your house

That's what makes the snow melt so fast on your roof. Do you like to buy coal to melt snow? This is sheer waste, and you can stop it by insulating the roof and walls of your house with

CABOT'S *Heat Insulating* **"QUILT"**

You can lay Quilt under your shingles, siding, tiles or boarding, or between your studs or rafters or under your attic floor. It will save enough coal to pay for itself in two or three Winters, and keep on saving heat and doctor's bills and making you comfortable as long as the house stands.

Send for Free Sample of Quilt and full information

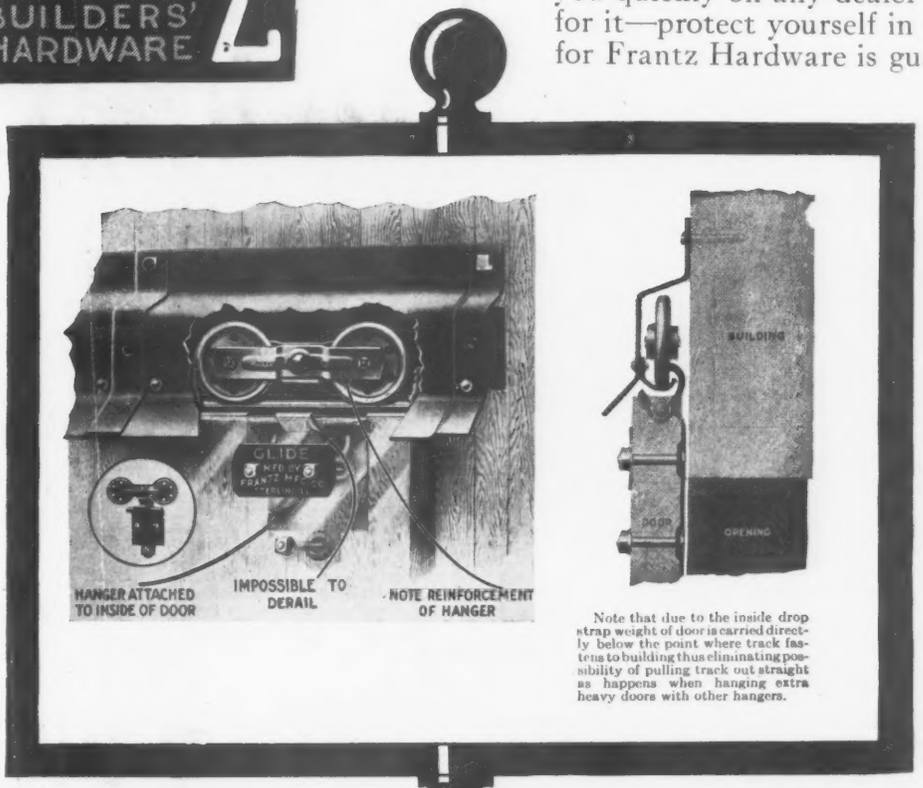
SAMUEL CABOT, Inc.
141 Milk Steet Boston, Mass.
342 Madison Avenue, New York
5000 Bloomingdale Ave., Chicago
Los Angeles Portland

Cabot's Creosote Stains, Waterproof Collopakes, Old Virginia White, Double-White, etc.

Look For This Trademark on All Builders' Hardware You Use Because:

FRANTZ GUARANTEED BUILDERS' HARDWARE

We are proud of the exceptional service rendered always by Frantz fixtures. This red label indentifies Frantz Hardware for you quickly on any dealer's shelf. Look for it—protect yourself in your selection for Frantz Hardware is guaranteed.



Made in Two Types Glide No. 1—Flexible; Glide No. 2—Adjustable.

Packed in strong fibre carton, complete with bolts, lag screws, end stops for track, socket wrench, name plates, and direction sheet.

Glide Barn Door Hangers with the original waterproof track will last as long as the barn. Easily installed. Carries doors of any thickness. Wheels and axles are larger with roller bearings. Derailing impossible. Patented glide track is bird-proof, rust-resisting. Made in one piece with patented joints that nest together.

Note that due to the inside drop strap weight of door is carried directly below the point where track fastens to building thus eliminating possibility of pulling track out straight as happens when hanging extra heavy doors with other hangers.

BUILDERS' HARDWARE

HOUSES, BARNS and GARAGES

When a prospect asks, "What kind of hardware do you recommend for my new home, garage or barn?" builders are advising Frantz fixtures with the assurance they will give him service that will add to his confidence in his service.

Frantz Builders hardware holds the good will of thousands of dealers because they have found that Frantz quality with the Frantz guarantee in turn build up good will among customers for Frantz dealers.

Many builders and dealers are cashing in on the popularity of Frantz Red Labeled Fixtures by specifying and selling them to their clientele.

The prices of Frantz products represent true bargains in service. They have been priced as low as possible consistent with the best suited materials and excellent workmanship which are assured in any fixture bearing the Frantz red label. You may specify and sell Frantz Builders' Hardware to your customers with confidence that the users will receive more than their money's worth in comparison with the service per dollar obtained from similar merchandise.

Whether barn, home or garage, specify and insist on Frantz Hardware. Check the coupon at the bottom of this page for full information on our full line of Builders' Hardware.

Check and mail the coupon below

Frantz Manufacturing Company
Sterling, Illinois

Gentlemen:—I am interested in.....Barn.....Garage.....Home hardware. Please send me complete information.

Name.....Address.....City.....